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DEVOTED TO THE OPERATING, TECHNICAL, AND BUSINESS PROBLEMS OF THE COAL MINING INDUSTRY

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Mechanization—Top and Bottom

WERE confirmation of the wisdom of the Coal Division of the A. I. M. E. in featuring preparation problems at its Pittsburgh meeting necessary, government statistics on mechanically cleaned bituminous coal, made public Sept. 6, unmistakably furnish it. Mechanical preparation in 1929, Bureau of Mines figures show, ran a dead heat on tonnage with mechanical loading. In both cases, installations of equipment late in the year foreshadow much greater increases in volume in 1930.

SUBSTANTIAL TONNAGES in both developments have been concentrated in relatively few states. In the case of mechanical loading, four states accounted for 74.9 per cent of the volume so handled underground last year; eight states contributed 95.3 per cent of the bituminous tonnage prepared mechanically during the same period. The total quantity of soft coal so cleaned was 37,143,000 net tons.

CERTAIN STATES which loom large in underground mechanization, however, play a small part in mechanical cleaning. This is not surprising despite the fact that mechanical loading is generally accepted in most fields as the forerunner of mechanical cleaning. But the situation is significant—as spotting out those areas in which an early swing from older methods may be expected. The soundness of this viewpoint is emphasized by many of the modernization programs now under way.

COMMERCIAL considerations also will promote further expansion even in districts where physical conditions, natural or induced by mechanized loading, are not a spur to such topworks mechanization. Mechanically prepared coal is acquiring a sales value which, if not yet adequately reflected in prices received, is evident in tonnage. Each increase in this output impresses additional sales value on the product.

BOTH FORMS of mechanization, therefore, must continue to advance—one that costs may be lowered and labor lightened; the other, that the product may be improved. With the industry realizing, perhaps as never before, the dominating position of the consumer, no operator can afford to ignore these lessons of the postwar trends.

A Coal Mine From on High

Jerome (Pa.) Mines, Hillman Coal & Coke Co.

EFFICIENCY AND SIMPLICITY

+ Goal in New Mine

Of Pond Creek Pocahontas Co.

By J. H. EDWARDS

Associate Editor, Coal Age

IN McDowell County, W.Va., the Pond Creek Pocahontas Co., which is controlled by the same interests as the Island Creek Coal Co., has opened a new mine known as Pond Creek Pocahontas No. 3, notable for simplicity and efficiency of equipment, rapid development to rated tonnage, and excellent natural conditions. The tipple was put into operation Feb. 3 of this year, loading 30 tons on that day, when but 500 ft. of headings had been driven from the bottom of the slope and air shaft. By Aug. 15 the mine had reached a production of 2,400 tons.

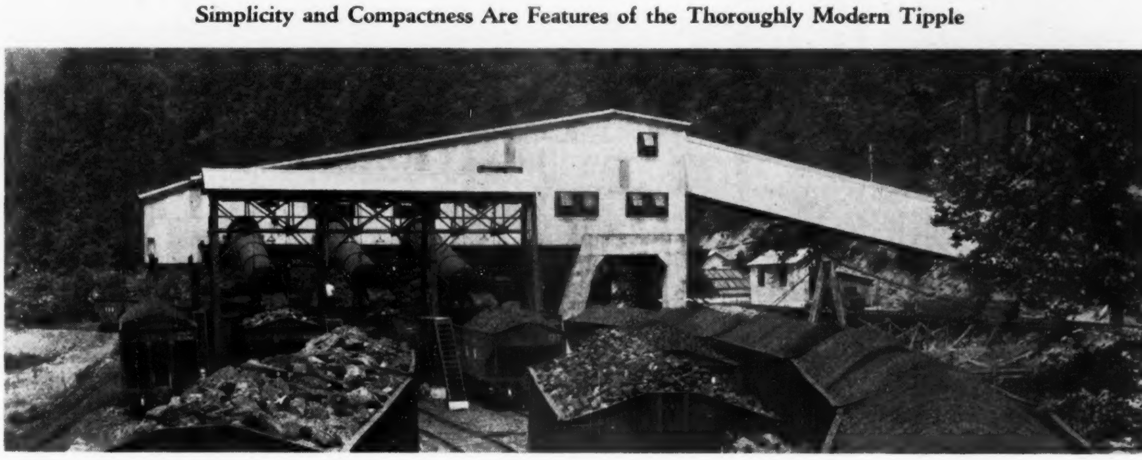
This mine is near Bartley, 16 miles from Iaeger, on the Dry Fork branch of the Norfolk & Western R.R. in the Tug River district. It is in a tract of 3,600 acres, owned in fee, in which the company has for several years been mining the Pocahontas No. 4 seam through a 585-ft. shaft. The new mine is in the Beckley seam, which in this locality lies 390 ft. above the Pocahontas No. 4 and 90 ft. below the railroad tracks at the point selected for the opening. Value was first attached to the Beckley seam on the tract when several test holes to the No. 4 seam penetrated a consistent thickness of clean coal above. Core drillings made later to prove the Beckley seam indicate that there is available approximately 2,500 acres of coal, without parting and lying practically level, averaging 52 in. in thickness.

By proximate analysis the Beckley coal is almost the same in every particular as that from the Pocahontas No. 4 seam. It has the advantage of being much harder, and therefore stands handling. The yield in a typical month was: Lump over 7½ in. round, 16.53 per cent; egg (2½x7½ in.), 24.47 per cent; stove (1x2½ in.), 15.55 per cent; nut (½x1 in.), 11.34 per cent; and ½-in. slack, 32.11 per cent. Lump, egg, and stove total 56.55 per cent.

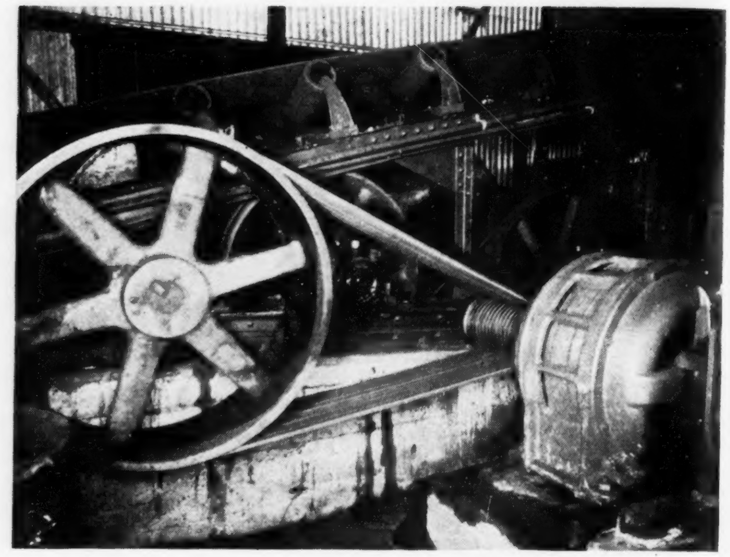
Entry is by a rock slope 300 ft. long on a pitch of 18 deg. This slope is equipped with a 42-in. belt conveyor that extends beyond the portal through a gallery 200 ft. long across Dry Fork Creek to the tipple. The conveyor drive, consisting of a 75-hp. Type FTR induction motor, multiple V-belt connection and two traction pulleys geared without differential, is located at the portal of the slope on a low foundation. In the slope is a supply track which parallels the belt conveyor.

Steel cars of the lift-end gate type having wood bottoms were selected. These have a capacity of 95 cu.ft. level full and stand 28 in. above the rail on wheels equipped with Enterprise solid-roller bearings. The slope bottom is equipped with an electric reciprocating car feeder, automatic cager, cross-over dump, 9-ton bin,

Simplicity and Compactness Are Features of the Thoroughly Modern Tipple



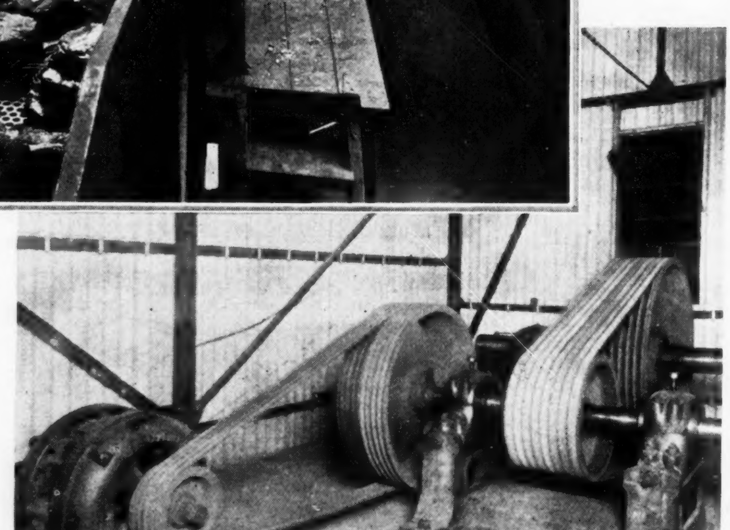
These Columns Supporting the Shaker Drive Are Integral With a 26x24-Ft. Mat, 11½ Ft. Below the Track



The Main Conveyor Drive Is Located on the Ground at the Slope Portal

The Picking Table Screen Is Well Illuminated From Windows and Skylights

Looking Down the Conveyor Gallery From the Tipple to the Slope Portal



Multiple V Belt and Countershaft Fan Drive in Corrugated Asbestos Building

reciprocating coal feeder to the belt, and gravity kick-back for the empties. When the dumper pushes the car-feeder button a "duck" engages the bottom of the car and moves the trip forward one car length, at which point a limit switch causes the "duck" to return automatically to starting position. With another button, the dumper can stop the movement at any point if necessary.

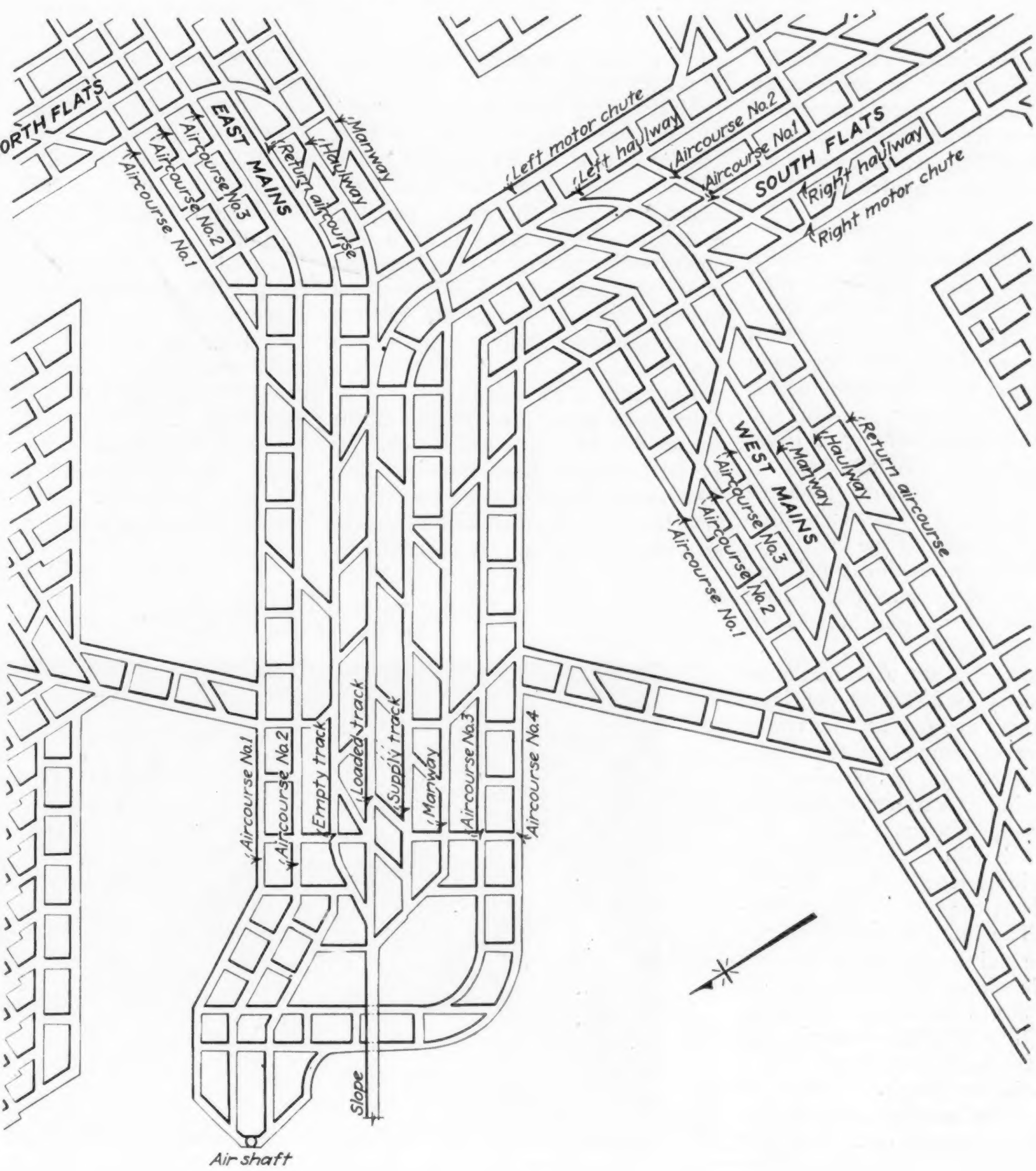
Headings are driven 15 ft. wide, and rooms 26 ft. wide on 60-ft. centers to a depth of 300 ft. A strong sand-rock top makes posting unnecessary. The only chance of extraneous matter getting into the coal is from a $\frac{3}{8}$-in. vein of slate which clings to the sand-rock top. What little falls and is not cast aside by the loader, is easily removed in the tipple by hand picking because it remains in fairly large layers. Experience to date indicates that the best shooting practice is to drill the usual center hole and two side holes. Two to three $1\frac{1}{4}$x9-in. sticks of Monobel No. 9 are used in the center hole and $1\frac{1}{2}$ sticks in each rib hole.

Mining equipment consists of four Jeffrey 35-BB undercutters which stand 33 in. above the rail when mounted on the truck. Gathering equipment consists of five Jeffrey cable-reel locomotives, inside frame, standard type, $26\frac{1}{2}$ in. high, with a speed of 4 miles per hour. For main haulage there is one 10-ton outside frame locomotive, 32 in. high, arranged for tandem operation with a similar locomotive to be purchased when the need arises. An "MSA" low-pressure, 800-lb. hopper, rock duster, 32 in. high, completes the inside equipment.

Sixty-pound rail is used on mains, 40-lb. on flats, and 25-lb. on butts and in rooms. Steel ties are used in rooms, 4x6-in. wood ties on flats and butts and 5x7-in. ties on mains.

At an air shaft located 200 ft. from the slope portal there is a Jeffrey 5x10-ft. reversible fan operating exhausting, driven by a 25-hp. squirrel-cage motor with manual control. At present the fan is operating at 80 r.p.m. and delivering 100,000 cu.ft. of air against a $\frac{1}{2}$-in. water gage. The drive is a multiple V-belt with a counter shaft on slide rails between

Bottom Plan, Pond Creek Pocahontas No. 3 Mine



Loading From a Slabbing Cut in a Room; Car Used Stands Only 28 In. Above Rail

motor and fan shaft. This provides maximum flexibility in substituting larger motors as higher fan speeds become necessary and makes for convenience in adding an auxiliary motor if that should become advisable.

INASMUCH as the mine liberates some gas, closed lights are used and an air-flow contactor device opens the 275-volt d.c., feeder breaker thus cutting power off the inside circuits in case the fan stops. The substation is located outside, close to the fan, and both the substation building and that housing the fan drive are built of corrugated asbestos board mounted on steel framing. The substation contains one 200-kw. Type HCC synchronous converter with manual control. Foundations and ducts have been provided for the installation of an additional unit.

Considering that the minimum rated capacity is 250 tons per hour and that there are five loading tracks for loading as many sizes, the tipple, built by the Roberts & Schaefer Co., is outstanding as a compact structure. It contains a Marcus picking table screen fitted with a rescreening section providing for picking run of mine without the use of mixing conveyors. The lump is picked on the main table and the egg and stove sizes on the side wings. Directly under the Marcus are two Arms vibrating screens. The structure is equivalent to that of a four-track tipple except for a small overhanging addition at the end of the building accommodating the discharge end of a 24-in. belt conveyor and a chute for loading nut on a fifth track.

Picked sizes are loaded over three outdoor, individual-covered, belt-type loading booms which use the same width of belting as the slope conveyor. Because the tipple building is narrow, the windows in each side opposite the picking tables, together with the skylights above, allow natural light to strike the picking table advantageously from three directions.

Ruggedness of equipment is considered of prime importance in the tipple design, therefore a No. 10 Marcus driving head was installed. This is the heaviest made and is one size larger than is standard for the size of screen used. It is driven by a 25-hp. Type FTR induction motor connected by a short-center flat belt with idler. One 15-hp. motor drives all three loading-boom conveyors, but clutches are provided so that any boom can be cut out of service.

As the tipple had to be built on loose ground beside the creek, it was a problem to provide a secure foundation for the heavy Marcus drive to be located about 24 ft. above the track. To support the four concrete columns carrying the drive floor, a concrete mat or footer 26x34 ft. and 3½ ft. thick was laid 11½ ft. below the surface. This rests on 38 wood piles of 6-in. tip diameter and 14 to 16 ft. long. Thirteen tons of reinforcing was used in the footer and columns. Excepting for floors of concrete, the remainder of the tipple is of steel.

One six-room house, six eight-room houses, and three boarding houses have been built. Thirty additional houses, three boarding houses, and a store are now under construction. An unusual feature is that California redwood siding is used for all. This material should last the life of the mine even if not painted. Composition roofing is the standard for all buildings. Every house is equipped with bathroom, standard flush toilet, kitchen sink, and hot-water tank. All are underpinned with 1-in. oak lumber.

All equipment at the mine is brand new. Second-hand machinery could have been secured at bargain prices but was considered a poor investment. Everything was planned to suit the condition. Efficient and reliable operation was the first consideration.

Four of These Machines Are Cutting 2,500 Tons of Coal Per Day

MECHANICAL CLEANING

+ Of Bituminous Coal Establishes New Tonnage Record

By H. O. ROGERS and F. G. TRYON

Statistics Section, Coal Division
U. S. Bureau of Mines
Washington, D. C.

MECHANICAL CLEANING of bituminous coal by wet and dry processes established a new record in 1929, the total of cleaned coal produced being 37,143,000 tons, an increase of 29.0 per cent over the preceding year. Pneumatic cleaning registered an increase of 54.3 per cent and wet washing of all types a gain of 25.2 per cent.

These figures are based on information furnished by the bituminous coal operators, in the gathering of which manufacturers were asked to supply complete lists of installations. In view of the rapid expansion of mechanical cleaning, there may be other plants not reported. Included in the tonnage from wet washing is that of five central washeries operated by steel companies: This is shown separately, because hitherto such data have not been available. Central washeries located near the mines and operated by mining companies are listed under the heading "At the Mines." The statistics do not embrace the large tonnage of anthracite which is cleaned mechanically, nor Bradford breakers and spiral separators, although both of the latter may properly be listed among devices for cleaning coal. Finally, hand-picking of bituminous coal is not included.

In Table II the tonnage handled by each of the principal types of washing equipment is shown. Of the grand total mechanically cleaned in 1929, pneumatic methods accounted for 15.7 per cent and wet methods for 84.3 per cent. Jigs continue the dominant type of equipment in wet washing, contributing over half the total tonnage last year. Concentrating tables produced 3,660,000 tons individually, and in combination with jigs produced 746,000 tons.

Table I—Bituminous Coal Mechanically Cleaned by Wet and Pneumatic Methods in the United States, in Net Tons of Clean Coal

	1928	1929	Per Cent of Increase
By wet methods			
At the mines....	a21,188,911	26,772,000	26.3
At central washeries operated by consumers.	a3,807,943	4,527,000	18.9
Total wet..	24,996,854	31,299,000	25.2
By pneumatic methods........	3,786,185	5,844,000	54.3
Grand total	28,783,039	37,143,000	29.0

(a) Revised.

Next to the jigs, the largest tonnage was contributed by the group "Launders and Upward-Current Classifiers." This group accounted for 7,103,000 tons. It includes a number of diversified types, such as Rheolaveur launders, Chance sand-flotation cones, and Menzies hydro-separators, as well as tub washers. Most of the growth in recent years has been in the groups, "Launders and Upward-Current Classifiers" and "Pneumatic Processes."

Undoubtedly, the figures representing the tonnage of coal cleaned in 1929 are less than the capacity of the plants now installed. Many plants did not begin to produce until late in the year; others operated at less than capacity. The total production of all coal—cleaned and not cleaned—at the mines provided with cleaning facilities is shown in the last column of Table II. This production is two or three times that of cleaned coal proper, indicating a further large

Table II—Bituminous Coal Mechanically Cleaned in 1929, Classified by Type of Washing Equipment

(Note that central washeries operated by consumers are included)

	Number of Plants	Cleaned Coal — Net Tons	Cleaned Coal — Per Cent	Total Production at Mines Served by Cleaning Plants
Wet methods:				
Jigs	150	19,598,940	52.8	33,832,453
Jigs in combination with concentrating tables	9	746,185	2.0	1,062,212
Concentrating tables	14	3,659,976	9.9	6,721,855
Launders and upward-current classifiers*a*	55	7,103,086	19.1	21,481,489
Unspecified	9	190,808	0.5	311,994
Total wet	237	31,298,995	84.3	63,410,003
Pneumatic methods	43	5,843,979	15.7	15,732,139
Grand total	280	37,142,974	100.0	*b*74,606,590

(*a*) Includes Rheolaveur and also Chance processes. (*b*) The total excludes duplications where the same mine is served by both wet methods and pneumatic methods.

Table III—Bituminous Coal Mechanically Cleaned by Wet and Pneumatic Methods in 1929, by States, in Net Tons of Clean Coal

(Central washeries operated by consumers in Colorado and Pennsylvania are included)

	Wet Methods (tons)	Pneumatic Methods (Tons	Total Tons	Per Cent of State Output Mechanically Cleaned
Alabama	*a*13,586,000	(*a*)	13,586,000	76.8
Arkansas and Montana	83,000	....	83,000	1.6
Colorado	1,271,000	....	1,271,000	12.8
Illinois and Indiana	*a*1,025,000	(*a*)	1,025,000	1.3
Kentucky	*a*802,000	(*a*)	802,000	1.3
Michigan and Ohio	362,000	....	362,000	1.5
Pennsylvania	8,629,000	2,470,000	11,099,000	7.8
Tennessee	308,000	....	308,000	5.4
Washington	968,000	....	968,000	38.4
West Virginia and Virginia	4,426,000	3,213,000	7,639,000	5.1
Grand total	31,299,000	5,844,000	37,143,000	7.0

*a*To conceal individual operations the tonnage cleaned by pneumatic methods is combined with that by wet methods in Alabama, Illinois and Kentucky.

Table IV—Growth of Total Tonnage of Bituminous Coal Mechanically Cleaned, 1906 to 1929, in Net Tons of Clean Coal

(Data for central washeries operated by consumers are not available before 1927)

Year	Wet Methods (Tons)	Pneumatic Methods (Tons)	Total at Mines (Tons)	Per Cent of National Production	Washed at Central Plants Operated by Consumers	Grand Total
1906	9,251,946	....	9,251,946	2.7	No data	No data
1907	11,269,518	....	11,269,518	2.9	No data	No data
1909	14,443,147	....	14,443,147	3.8	No data	No data
1912	17,538,572	....	17,538,572	3.9	No data	No data
1913	22,069,691	....	22,069,691	4.6	No data	No data
1915	20,873,727	....	20,873,727	4.7	No data	No data
1917	25,483,696	....	25,483,696	4.6	No data	No data
1918	22,017,293	....	22,017,293	3.8	No data	No data
1919	16,884,062	(*a*)	(*a*)	*b*3.6	No data	No data
1920	17,984,289	(*a*)	(*a*)	*b*3.3	No data	No data
1921	13,628,724	(*a*)	(*a*)	*b*3.4	No data	No.data
1923	20,140,385	(*a*)	(a)	*b*3.8	No data	No data
1927	21,119,441	3,650,584	24,770,025	4.8	2,922,022	27,692,047
1928	*c*21,188,911	3,786,185	24,975,096	5.0	*c*3,807,943	28,783,039
1929	26,772,000	5,844,000	32,616,000	6.2	4,527,000	37,143,000

(*a*) Data on pneumatic cleaning, which began in 1919, are not available for 1919 to 1923. The tonnage in those years, however, was small. (*b*) Includes an estimate for the tonnage cleaned pneumatically. (*c*) Revised figures.

Table V—Growth of Bituminous Coal Mechanically Cleaned at the Mines by Wet and Pneumatic Methods, by States, in Net Tons of Clean Coal

(Note that central washeries operated by consumers in Colorado and Pennsylvania are excluded, because of lack of data in the early years)

State	1907	1913	1917	1927	1929
Alabama	3,750,418	7,210,588	11,408,051	13,153,643	13,586,000
Arkansas and Oklahoma	150,507	47,292	....	14,896	10,000
Colo., N. Mex. and Mont	567,217	1,301,428	989,405	637,409	513,000
Georgia and Oregon	154,959	92,662	83,344	....	....
Illinois	2,465,767	3,664,928	4,651,154	560,642	527,000
Indiana	21,659	65,499	48,065	250,282	498,000
Kentucky	88,678	162,880	211,689	309,262	802,000
Maryland	9,856	....	34,693	....	....
Michigan	....	145,840	174,642	155,190	157,000
Missouri	72,227	118,681	37,617	....	....
Pennsylvania and Ohio	2,583,202	5,669,622	3,466,860	3,578,739	7,608,000
Tennessee	543,333	624,426	630,621	344,562	308,000
Texas	....	21,761	23,817	....	....
Washington	644,501	1,343,120	1,475,529	820,481	968,000
West Virginia and Virginia	217,194	1,539,541	2,248,209	4,944,919	7,639,000
Other States	....	61,423	....	....	....
Total at mines	11,269,518	22,069,691	25,483,696	24,770,025	32,616,000

increase in cleaned coal for 1930.

Alabama led the states with a total of 13,586,000 tons of mechanically cleaned coal. Pennsylvania was second, with 11,099,000 tons, and West Virginia (including for statistical purposes Virginia) was third, with 7,639,000 tons. Development of pneumatic cleaning has been greatest in southern West Virginia and Pennsylvania. Three other states reported production by pneumatic methods, but their tonnages cannot be shown.

The long-time trend in washing is shown in Table IV. For coal washed at the mines, the record dates back to 1906, in which year a total of 9,251,000 tons of coal was cleaned by wet methods. For the next ten years washing showed a steady increase, culminating in a peak of 25,480,000 tons in 1917.

Thereafter the tonnage cleaned by wet washing declined, and it was not until about 1924 that the decline was checked. Since then, active interest in preparation and the introduction of improved equipment have led to rapid expansion. In 1929 the tonnage cleaned by wet washing at the mines rose to a new high record, exceeding by 1,288,000 tons the previous high mark set in 1917.

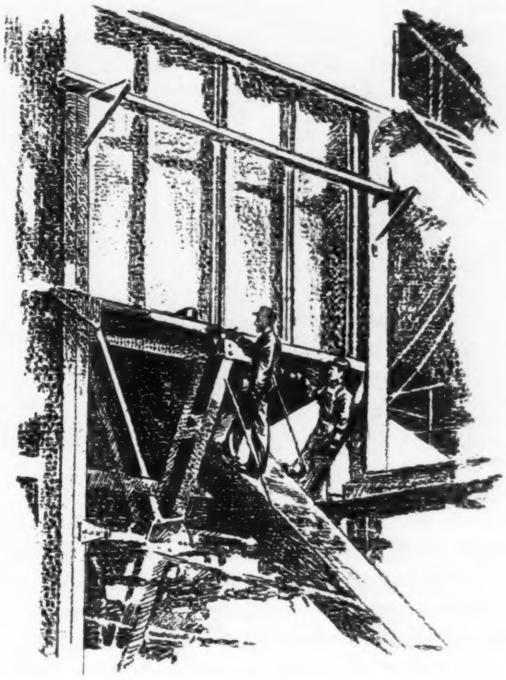
Pneumatic cleaning was first applied on a commercial scale in 1919. In the years following it has grown by leaps and bounds. As a result of the combined progress in both wet and pneumatic methods, the total tonnage cleaned at the mines now shows a large growth over 1917.

Table V gives a clear view of the change in tonnages washed by states. Because of the lack of data for the earlier years, it is necessary to exclude the central washeries operated by steel companies. Alabama and the Virginias show a consistent increase back to the earliest record. Illinois, on the other hand, increased rapidly from 1907 to 1917, and thereafter sharply declined. Pennsylvania shows a large increase in the period before the World War, followed by a recession; however, it has registered a large increase since 1927. Colorado and Washington, among other of the states where washing is important, recorded an increase up to 1917, when followed a perceptible decline.

In 1929, to produce the 37,143,000 tons of cleaned coal, a total of 3,442,000 tons of refuse was removed. This means that of the total material treated by cleaning plants, 8.5 per cent was refuse and 91.5 per cent was marketable product.

THE STATISTICS on the output of bituminous coal cleaned mechanically last year, made public by the U. S. Bureau of Mines at Washington, D. C., Sept. 6, make a particularly appropriate introduction to the meeting of the Coal Division of the A. I. M. E. at Pittsburgh, Pa., Sept. 11-13, where preparation was one of the major program themes.

Through the courtesy and co-operation of the Division, abstracts of a number of the papers presented at the Pittsburgh meeting are published in this issue of *Coal Age*, beginning at page 527. Abstracts of other papers and a story of the discussion taking place at the meeting will be published in October.



PAINTING

+ Has a Place in Mine Modernization

By T. J. MALONEY

New Jersey Zinc Co.
New York City

"I'M NOT familiar with what's in paint," remarked a mine superintendent, "but I do know what it does. I've seen many a painted wooden bridge outlive bridges of steel which were not properly maintained. Notice how well preserved are some of those old covered wagons after a hundred years or more. Iron may be strong, but it is not durable unless regularly painted."

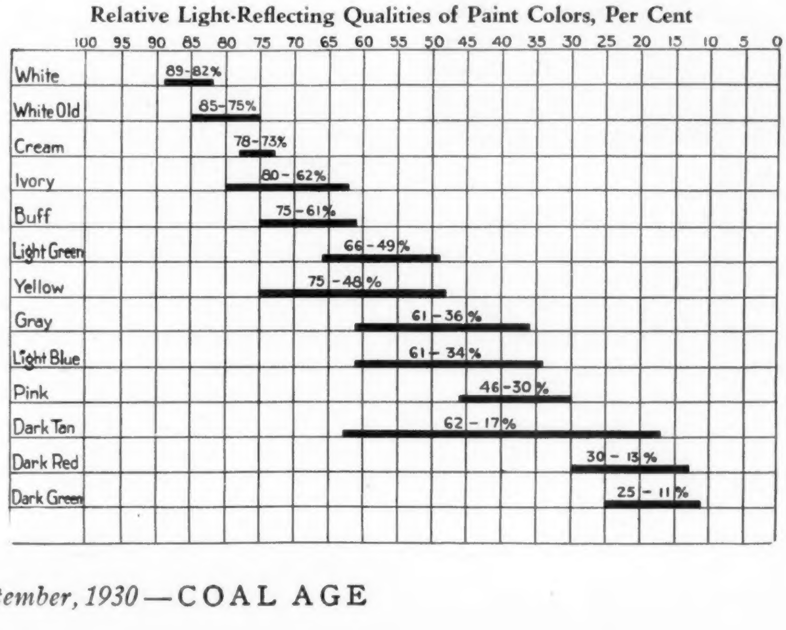
His comments explain why large coal companies in both the anthracite and the bituminous fields take such pains in painting equipment and structural surfaces in preparation plants and other buildings. But there is far more to painting than was pointed out by the superintendent. Of importance virtually equal to the preservation quality of paint are its powers to please the eye and to illuminate by reflection of natural and artificial light. Finally, painting, particularly in light colors, encourages cleanliness.

To make work surroundings pleasing to the eyes of employees should be the goal of every industrial. That objective is doubly salutary to those who directly serve the public as does the coal industry. A few years ago several of the modern breakers in the anthracite field were painted in colors which gave a maximum of illumination and pleased the eye. The results inspired the extension of a standing invitation to the public to visit these plants.

Examples of this practice are the Marvine breaker of the Hudson Coal Co. and the Baker breaker of the Glen Alden Coal Co. Signboards facing main highways invite passing motorists to inspect these plants. Regarding the value of this practice, a surface foreman remarked: "When we take a visitor through this breaker, he sees a huge structure built somewhat like a greenhouse, with white-painted gallery ceilings. He is impressed and gets a new view of the miner, the operator, and the industry at large. If we could send a continuous stream of people through this plant, the trouble would be rapaid, even though they got in our way."

Illumination has become a science to which painting has made a substantial contribution. Without paint, natural and artificial light cannot be properly diffused and reflected. Fig. 1 shows graphically the relative light-refecting values of various paint colors. White naturally has the highest rating. If black were listed, the gradation of tints downward would end

Relative Light-Reflecting Qualities of Paint Colors, Per Cent



at about zero, with gray in about the middle of the scale. Because light reflection is low in the darker shades, they should not be used in places difficult to illuminate. The degree to which tints of a particular color are lighter or darker than a chosen standard determines the reflection range of that color. There is no definitely fixed gray, green, or blue.

In recent years cleanliness has taken on a new meaning in industry. Modern plants are covered with paints which can be easily washed, and the process is repeated frequently. Plant-keeping schedules call for washing of the windows monthly. Even the floors are painted and thereafter scrubbed regularly. Cleanliness is suggested by white and light tinted paints. A light wall has a psychological effect on workmen, encouraging them to keep the surface clean, for any dirt splotch is immediately noticeable to the eye.

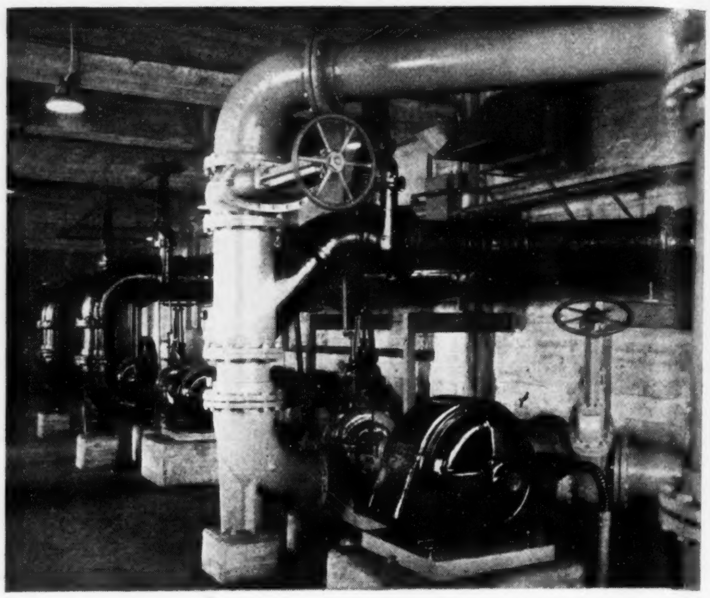
Flat paints and eggshell paints of quality can be as easily washed as paints that produce a glossy surface. The pigments in these paints consist of finely divided particles which give a smooth, even surface to flat paints; they also resist yellowing as well as glossy paints. Certain gases, such as hydrogen sulphide, sulphur dioxide, and ammonia, are ruinous to all paints except those specially compounded to resist their chemical attack. Neither zinc oxide nor lithopone, the pigments commonly used in light interior paints, are discolored by these gases.

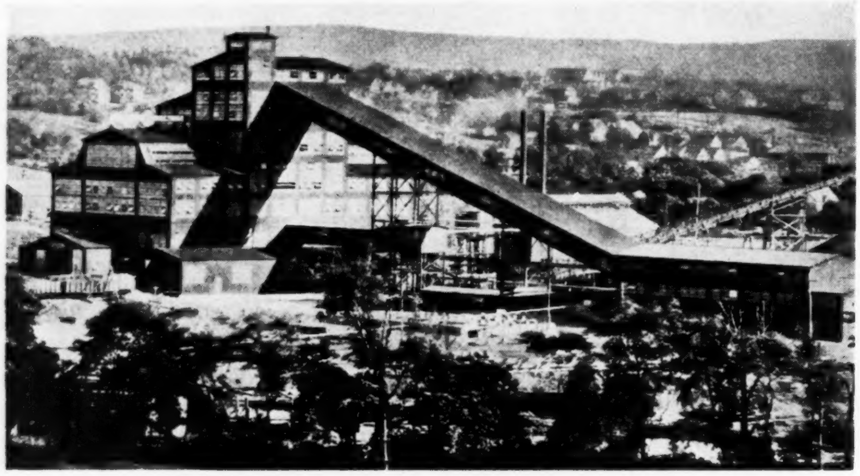
Numerous pigments are compounded for protective purposes. These, combined with the proper vehicle, should result in a paint which is chemically permanent, of high physical strength, capable of keeping out air and moisture, elastic, and rust inhibitive. Some pigments—graphite is one—stimulate rusting; they, therefore, should never be used in a priming coat. Following is a list of pigments that rate high as rust inhibitors: zinc dust, sublimed blue lead, red lead, carbon black, zinc chromate, and basic lead chromate. Suitability of a paint for galvanized surfaces largely depends on its physical properties. In addition, for iron and steel surfaces, it must have chemical properties to prevent corrosion. The outstanding requirements of a paint for galvanized sheet are: (1) That it be highly distensible over a long period of exposure to weathering; (2) that it have the property of thoroughly wetting the surface even after the film has oxidized; (3) that it adhere tenaciously. A paint of zinc dust and zinc oxide has great affinity for galvanized iron. Best results are obtained when it is used both in the priming coat and in the finish coat. Its light gray color is pleasing and shows little dirt.

Left — Pump Rooms, Too, Should Know the Paint Brush

Center — In Well-Regulated Plants Floors Are Kept Painted

Right — Painting Induces Orderliness in Plant Interiors



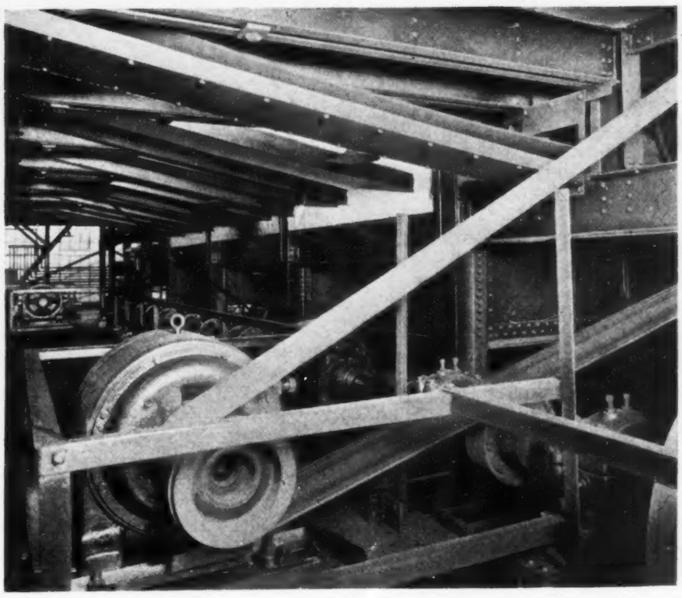


This Breaker Is Open to Public Inspection. Of Course, It Is Painted Inside and Out

That rotary dumps, conveyors, and similar equipment require a protective covering is proved by the fact that the manufacturer always paints them. Usually three or four coats are applied—one or two primer coats, a coat of protective paint of another color to show up any "holidays" or spots which have not been completely covered, and finally a dark colored enamel or lacquer finish. Repainting of some of this equipment is difficult, but the job can be done to economic advantage even at the expense of a reasonable loss of operating time.

Assuming that all structural iron and steel is painted primarily for protection, proper preparation of the surface for painting is fundamental. Rust under a coat of paint is unseen and will destroy not only the paint film over it but the metal itself. Mill scale will also ruin a paint job. A few months after paint has been applied over this scale it is liable to crack and peel. Examination will show that the mill scale is peeling and taking the paint with it. It is best to let the surface weather for a period to allow the scale either to rust or fall off. Then go over it with wire brushes and scrapers and remove all remaining scale and powdered rust.

New galvanized sheets present a smooth surface with no pores or pits into which a paint can penetrate for mechanical anchorage. Extreme changes in temperature also have a marked effect on the adherence of the paint. As a result ordinary paint will peel in large sheets, leaving the



bare metal exposed. Further difficulty may be encountered due to the adhesion of lubricants used in the sheet manufacturing process.

All things considered, weathering from two to six months is the best method of preparing galvanized surfaces. This will ordinarily remove any grease present and at the same time roughen or etch the surface of the metal. Removal of the grease allows the paint to come in direct contact with the metal and the roughened surface provides mechanical anchorage. However, sandblasting is a most effective preparatory treatment for all conditions of the surface. It cleans and etches in one operation, it is superior to any chemical treatment; but it is costly and limited in application.

No single method of chemical surface treatment can be depended upon to produce universally good results with every paint. A practical and economical chemical method of cleaning and etching in a single operation a surface contaminated with grease is to apply liberally a mixture of denatured alcohol (65 volumes), toluol (30 volumes), carbon tetrachloride (5 volumes), and hydrochloric acid (5 volumes).

Spray painting is economical on surfaces that demand little blocking out. Spray guns can be used to advantage on interior walls and ceilings as well as the exterior surface of buildings, tanks, stacks, and structural steel. But brushing has by no means been displaced entirely. Where interiors must be painted while operations are in progress, brushing often is indispensable. Because of the intricacy of its shape, machinery is best repainted by brush.

Painting schemes used in some of the breakers in the hard-coal fields may well serve as examples of the best mine-plant painting from the standpoint of cleanliness, protection, illumination, safety, and economy. The Baker breaker is a showplace of the industry. All ceilings are painted white for illumination and appearance. Walkways are covered with rubber mats and the floors are painted a bright orange. Roofing and structural members are covered with gloss paint in light colors. All machinery is black and lubrication cups are red for contrast. Bright orange paint is applied to the wooden rocker arms on the shaking screens. This plant is as clean and well kept as any power plant.

An example of a well-painted power house is the Oliphant plant of the Hudson Coal Co. In the engine room ceilings are painted white, as are the walls, which are finished with a black dado to a height of about 5 ft. above the floor. All machinery and structural members are black. A gloss paint is used in every case. The walls are repainted every five years by brush and spray gun; they are washed down once a year. The pump room, which is in the basement below the engine room, also is done in black and white, the latter color also being used for water and steam lines. The pumps are covered with a heat-resistant paint.

Interiors of mine shops should be painted in light colors. It is of interest to note that even blacksmith shops are being painted today at some plants. This is largely possible because smoke and gas from the forges are not allowed to escape into the interior of the building. These shops need all the light that can be made available and should be painted white. In supply rooms ceilings, walls, and racks should be painted white.

ENGINEERING FORETHOUGHT

+ Expedites Operation of Kansas Stripping

By ALPHONSE F. BROSKY

Associate Editor, Coal Age

AT THE No. 15 operation of the Pittsburg & Midway Coal Mining Co., located at Mineral, 22 miles southwest of Pittsburg, Kan., 22 in. of coal under approximately 26 ft. of overburden is being stripped. In the taking of this seam about 16 cu.yd. of overburden must be handled for every ton of coal mined. At the average daily rate of output, which is about 1,500 tons, this plant will produce about 250,000 tons in 1930 and will have a life of about 21 years. It is a new operation, which was started in November of last year and began to load coal the first of this year.

Pumping has been almost entirely eliminated by the substitution of natural drainage ditches over the entire area of the property and in the pit itself. Transportation has been simplified by avoiding the laying of track into the pit. Instead, the track is kept on the high wall and the coal transferred from the loader to the cars by a skip or bank machine. Tracks are arranged in a loop which facilitates the handling of the entire output with absolutely no interference between trips. At the preparation-plant end the flow of coal from the dump hopper and also over the shaking screens is controlled by a variable-speed transmission.

The seam mined is the Mineral. It lies 320 to 330 ft. above the Mississippi limestone and 80 to 90 ft. above the Cherokee seam, from which originates most of the stripped coal in the Kansas field. On the property the dip of this formation is about 22 ft. to the mile in the direction of North 70 deg. West. Being on a prairie, the property is flat and the cover over the coal uniformly thick with a maximum of about 35 ft. This last figure gives a ratio of overburden to coal which is about the economical maximum with the efficiency of present types of machines under conditions encountered on the property and the existing state of the market. Only a few years ago the maximum strippable cover for this property was held to be about 30 ft. Directly above the coal is 8 to 30 in. of hard black slate and above that is 8 to 12 ft. of shale which is capped with clay merging to soil for the remaining distance to the surface. This overburden is of such a nature that it must be blasted. Though soft, the shales are distinctly stratified, and for this reason the spoil material stacks well.

Because of the shape of the property, the coal will be stripped from four tracts consecutively. In each case a straight box cut will be established on the boundary line and made to sweep evenly across the tract. Maintenance of the straight cut is possible because of the uniformity of the formations and the flatness of the surface. The width of the pit will be kept to approximately 65 ft. and its maximum length will be about 5,200 ft. in No. 1 pit.

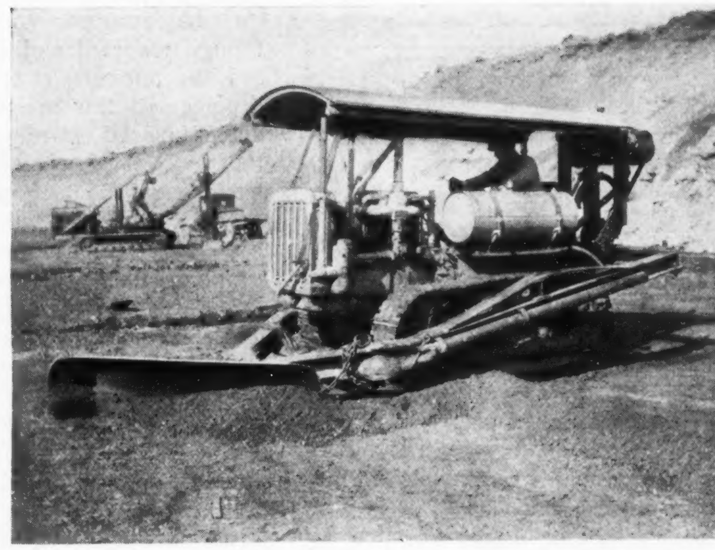
Coal is uncovered by a 12-cu.yd. Bucyrus-Erie 385-B electric shovel with a 78-ft. boom and a 52-ft. stick. This unit handles about 137,000 cu.yd. per month per 8-hour shift. As the shovel is double-shifted during the six warm months and triple-shifted during the six cold months, its monthly capacity is two to three times that given for the single-shift rate of operation. Incidentally, the ratio of running time between the stripping unit on the one hand and the loader and the tipple on the other is such that when the former operates 24 hours a day, the latter run 8 hours a day.

Time studies show that during only 21 per cent of the total operating time of the stripping shovel is the bucket in the bank. For this reason it has been important to minimize the angle of swing of the bucket. Usually, it is kept to 90 deg. or less. Material requiring the farthest reach of the bucket is deposited nearest to the

This Shovel Handles About 137,000 Cu.Yd. Per Month at a Single-Shift Rate

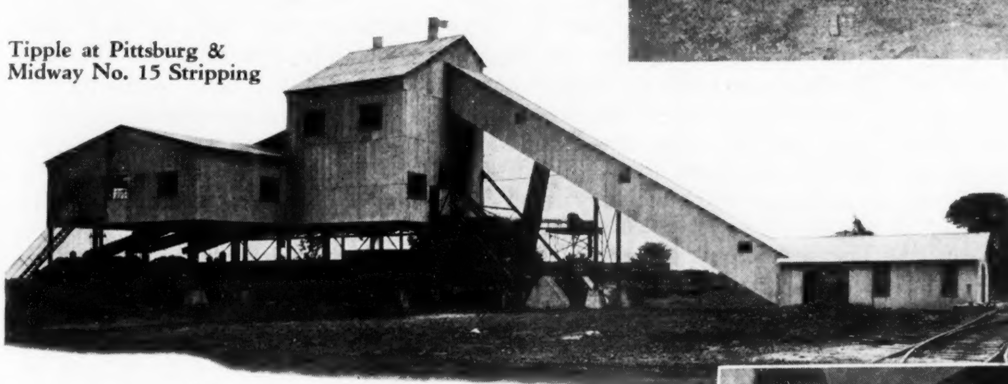
shovel to form a pilot or secondary wall, over and behind which the main mass of the spoil is piled. This practice keeps the angle of swing uniform and relatively narrow. Another practice that is closely followed is to root as much as possible of the material into the pit. Due to the soundness of the shale strata immediately over the coal, preparation for loading is adequate after the surface of the coal has been cleaned with a scraper blade propelled by a caterpillar tractor.

Because of the flatness of the surface of this property and because the



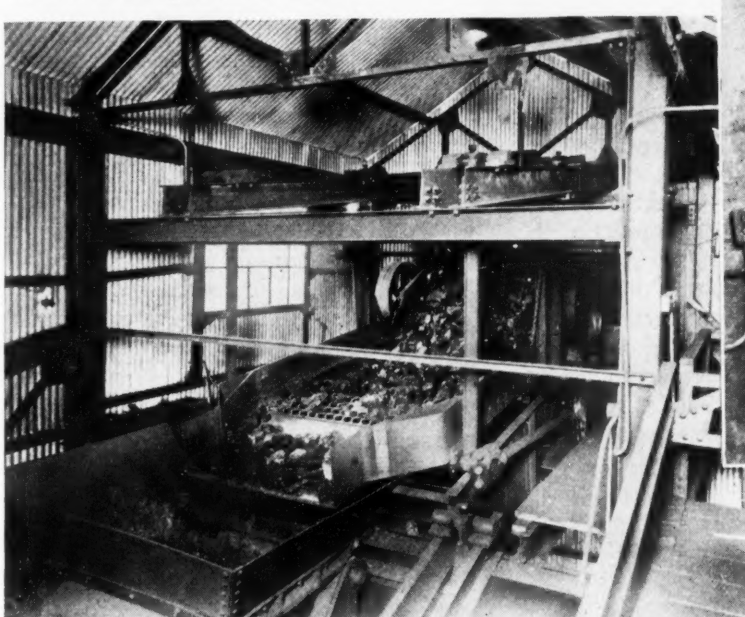
A Bulldozer Blade Removes Dirt Left on the Coal by the Shovel

Tipple at Pittsburg & Midway No. 15 Stripping



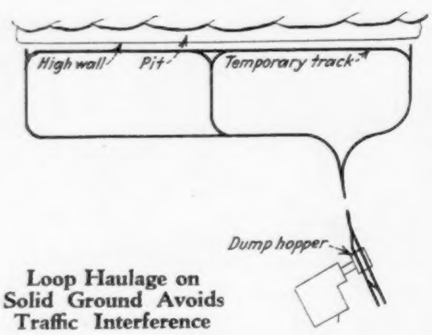
Variable-Speed Transmission on Shaker Screen

This Auxiliary Shaker Removes Fines From Coal Going to the Crusher



strata are such that the high wall stands well, haulage tracks are not carried into the pit but are maintained on the surface within a few feet of the brink. This system of track layout brings a number of operating economies. In it the shifting of track is simplified, the roadbed is more solid, grades are eliminated, and op-

Good Coal Is Separated From Impurities in This Rotary Breaker



Loop Haulage on Solid Ground Avoids Traffic Interference

eration of the shovels is not impaired by the presence of track.

With this arrangement, it is necessary to transfer coal from the pit to cars on the high wall by a skip or a bank machine. Coal is loaded by a $2\frac{1}{2}$-yd. horizontal thrust type of shovel. By reason of its performance characteristics, chiefly its crowding action parallel to the bedding planes of the coal, this unit gives a maximum of coarse sizes. As the capacity of the skip is 7 tons, three passes of the shovel fill the skip.

Remote loading through the agency of the skip has an advantage in that this unit can be spotted near the loader. In consequence, the swing of the loader can be kept to less than 45 deg. The capacity and speed of these two units are so proportioned that the skip can be raised to the surface track, emptied into the cars, and returned while the loader is filled and placed into position ready to empty into the skip.

In the accompanying sketch is shown the general layout of the tracks schematically. It will be noted that near the pit the shape of the track system is an elongated loop which is further subdivided into two smaller loops by a short cross line midway of the pit extremities. A single track runs from the loop to the tipple dump. This track is of standard gage and is laid with 70-lb. rails. The temporary track, that nearest to and paralleling the pit, is slued by a tractor. This loop layout altogether eliminated interference between trips, of which there are but two. A trip consists of three 35-ton Sanford-Day 8-wheel drop-bottom cars which are hauled by a 25-ton Vulcan gasoline locomotive. With stability and ruggedness of the track and the absence of grades, the large car has speeded transportation and proved economically advantageous. The drop-bottom feature has speeded up the unloading of the car, a trip being emptied over a 180-ton dump hopper in about 35 seconds. This hopper is superimposed by two tracks and so the cars can be dumped without shifting, though reversed end for end.

Little pumping is required for the drainage of this property. Dependence is placed entirely on ditches for the removal of water from both the surface and the open pit. In order to do this effectively, the surface has been closely contoured and a topographical map prepared which shows practically all irregularities in the surface. A structural map of the coal bed also has been prepared on close contour intervals from the drill logs.

On the surface ditches are established so as to follow the contour lines, a primary ditch being placed at intervals of about 640 ft. This ditch breaks into the watershed. It is made as much as 18 ft. deep and is dug with a Diesel dragline using a $\frac{3}{4}$-yd. bucket. The area between the pit and the main ditch is drained by a secondary ditch which is maintained within 10 to 15 ft. of the high wall. The secondary ditches are excavated by a tractor-propelled ditcher. Where this secondary ditch crosses a draw or a ravine descending into the pit, an earthwork dam is thrown up by the stripping shovel and the water impounded in the area, which seldom exceeds one acre, is removed by a small portable pump. Similarly, in the pit, except for small swags which are pumped, water is conducted away from the working area by ditches.

Maximum efficiency in the preparation of coal on the tipple has been gotten by the installation of variable-speed transmission units in the drives of the reciprocating feeder under the dump hopper and the shaker screen, coal being transferred from one to the other by means of an apron-type conveyor. This arrangement allows an exact adjustment of the feed into the tipple. During periods when the tonnage coming from the pit is relatively low these units may be slowed down; if the coal enters the plant wet or if a large tonnage is to be handled the drives can be speeded up. This is accomplished simply by turning a handwheel on the transmission.

The unit used for this purpose is the Reeves variable speed transmission, a No. 3 for the feeder and a No. 6 for the shaker screen. In the main, this mechanism consists of two pairs of bevelled disks, each spline mounted on one of two parallel shafts, which are connected by a V-shaped belt to fit a V-shaped throat formed by the disks. This transmission can be seen in one of the accompanying illustrations. Adjustment of the speed is accomplished by shifting levers which increase the gap between one pair of disks and simultaneously decrease the gap between the opposite pair. In consequence, with one shaft being driven at a constant speed from the source of power, the speed of the opposite shaft can be increased or decreased by the adjustment of these disks so that the V-belt turns on a larger or smaller diameter.

A single-roll crusher is installed in the tipple at the head end of the conveyor from the dump hopper and is used to crush the mine-run coal when the market demands smaller sizes. Before entering the crusher, however, the mine-run is passed over an auxiliary shaking screen and the minus size is bypassed. The tipple also is provided with rapid shakers which separate minus $1\frac{1}{4}$-in. coal into three sizes, $1\frac{1}{4}$x$\frac{3}{4}$-in. and $\frac{3}{4}$x$\frac{3}{16}$-in. and $\frac{3}{16}$x0-in. Coal clinging to refuse rejected from the picking table is diverted to a rotary breaker which yields a $1\frac{1}{4}$x0-in. clean coal.

A Skip Is Used to Transfer the Coal From the Pit to Cars on a High Wall

PROBING PROBLEMS

+ Of Pneumatic Cleaning of Bituminous Coal

By THOMAS FRASER

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A NUMBER of unforeseen problems have been brought to light in the few years that dry methods of treatment have been in commercial use. The pneumatic concentrators first adapted to coal had already been developed to a fair efficiency—low ratings notwithstanding—in ore dressing. They were more perfected relatively than the general technology of dry cleaning. For this reason, the major difficulties encountered were in the accessory operations rather than in the functioning of the cleaners themselves. The crudities of a new technology were further aggravated, in some cases, by meagerness of appropriations, which precluded adequate storage bins and other facilities recognized as indispensable to older types of cleaning plants.

Dry cleaning is now sufficiently established that we may critically examine equipments and operations auxiliary to the pneumatic table and its functioning. The processes have now been so simplified, with respect to pre-sizing of the raw coal and the quantity of air circulated, that stinting of expenditures for auxiliary equipment is not necessary to keep the per-ton cost of installation in line with complete and well-designed plants of other types. Furthermore, sufficient operating experience has been accumulated to ascertain the conditions most conducive to effective operation of dry-cleaning machines; at least the essentials of a definite technology of dry cleaning have been established.

The real problems in dry cleaning have been relatively few but difficult. They are: (1) Proper sizing of raw coal to suit the cleaning process; (2) handling of raw coal when it is delivered wet from the mine; (3) dust collecting; and (4) maintainance of uniformity in cleaning performance. It is apparent that these problems concerned not the design and adjustment of the cleaning machines but rather the servicing of these machines and the conditioning of the raw coal before treatment.

Sizing of the raw coal, when dry, has become a fairly simple mechanical operation since the introduction of modern concentrating machines capable of handling a wider range of sizes. Yet the cleaning of extremely fine sizes still involves some screening difficulties even when the coal is dry. The practice of treating unsized feed on stratifying tables, while eliminating altogether the necessity for presizing of the feed, has introduced a new condition calling for a certain degree of uniformity in size composition. This may also be considered a matter of size control and involves some conditioning of the raw coal before treatment.

Most of the difficulty in screening lies in the handling of wet coal. Excessive moisture may also affect the operation of pneumatic tables, particularly if the moisture fluctuates. However, the cleaning operation is not affected, as a rule, until the moisture measurably exceeds the percentage that causes trouble in fine screening. In either wet or dry processes, water, in one way or another, accounts for much of the operating trouble. Therefore, if the coal can be delivered in a uniformly dry condition, a dry plant should provide a simple answer to the cleaning question.

After being insured a properly conditioned feed, uniform performance depends largely on the mechanical equipment available to supply an uninterrupted, uniform flow of raw coal, air, and power. Maintainance of favorable operating conditions without interruption is necessary to uniformity of product, which is fully as important as purity.

For sizing dry small coal preparatory to air cleaning, practice is virtually standardized on high-speed vibrating screens. The high-frequency stroke of small amplitude has established its superiority for capacity and freedom from blinding. Vibrating screens of the inclined, gravity-

From a paper presented at the Pittsburgh meeting of the A.I.M.E., Sept. 11.

feed type or of the horizontal, conveying type are about equally effective in this service. The inclined type has the advantages of low power consumption and of imparting little vibration to the supporting structure; the horizontal type will make a more precise separation at the screen aper-

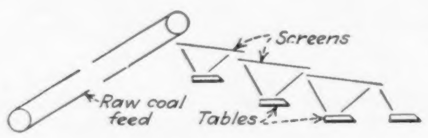


Fig. 1—Early-Installation Layout; Raw Coal to Screens to Tables

ture size and operates with less loss of head room.

Oblong-mesh (Ton-cap or Rektang) wire cloth is used as the screening medium for the sizes under $\frac{1}{2}$ in., because of its large percentage of opening space as compared with either punched plate or square-mesh cloth. A screen fabric made of steel music wire wound on or welded to heavier cross wires spaced $3\frac{1}{2}$ to 4 in. apart promises even greater freedom from blinding. The meshes of these cloths are designated by the net width of opening and may be obtained in sizes down to $\frac{1}{16}$-in. The openings in the $\frac{1}{16}$-in. cloth is $3\frac{1}{2}$ in. long. This gives a very large percentage of opening area and the scouring action of coal passing over the long unobstructed lengths of longitudinal wires prevents the accumulation of mud or fireclay on the screen.

IN THE early plants where the raw coal was separated into a number of sizes before treatment, and no storage facilities were provided, difficulty was experienced both in screening and cleaning. This was due to great variations in the feed going to individual units as the size composition of the mine-run coal changed. Irregular loading of both screen and separator units resulted. Difficulties in screening were overcome by providing ample excess screen area, but irregular operation of the table could not be corrected in this manner. Frequent starting and stopping of machines and operation of some machines with too light a load followed. Simplification of sizing schedules has greatly reduced this source of trouble, but irregularity in operation of the tables is still unavoidable at plants represented by the flow sheet shown in Fig. 1, which provide virtually no storage for conditioned separator feed.

When raw coal storage is provided to enable the cleaning plant to operate uninterruptedly, with irregular delivery of coal from the mine, the main storage bins may be located, as shown in Fig. 2, to receive raw unsized plant feed; or the bins may be placed after the screens to store the sized feed in condition for treatment, as shown in Fig. 3. With the arrangement shown in Fig. 2, at a plant equipped with tables that require a sized feed, coal is drawn out at a uniform rate to the screens, furnishing an ideal feeding arrangement for screening and enabling the cleaning plant to operate when the mine is idle. However, this arrangement does not provide a constant feed to the various cleaning units, as the machines in each set must take the product delivered by the screens auxiliary to them, and the load on any separator will vary as the size composition of the screen feed varies.

The plan shown in Fig. 3 provides for large-scale storage of sized coal in condition for treatment by the separators. It has the great advantage

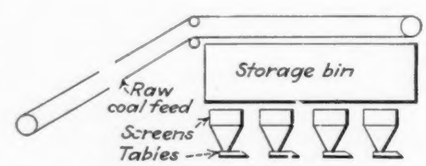


Fig. 2—Layout for More Uniform Cleaning Table Operation

of providing a uniform, uninterrupted feed of sized coal to each separator regardless of fluctuations in either the rate of production of raw coal or its size composition. It also has the advantage of more compact plant construction than is indicated in Fig. 2. When the raw coal is to be treated in three sizes, for example $1\frac{1}{4}$x$2\frac{1}{2}$ in., $\frac{5}{16}$x$1\frac{1}{4}$ in., and 0x$\frac{5}{16}$ in., the raw coal, delivered into the plant by an inclined conveyor, may be sized on two rows of double-deck vibrating screens arranged upon opposite sides of the horizontal run of the conveyor. Separate conveyors are required to carry three sized products to three storage bins. Three sets of separators below these bins are arranged to take the sized coal through individual feeders. This provides positive con-

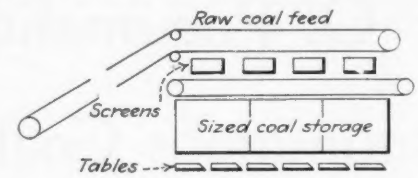


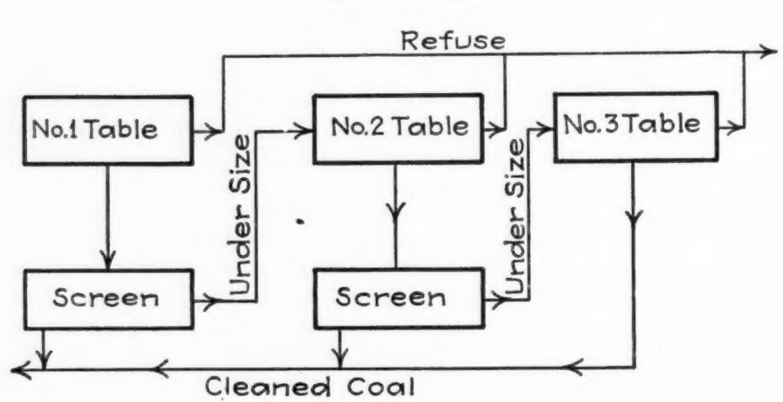
Fig. 3—For Storage of Sized Coal Ready for Treatment

trol of the feed to each cleaning machine, where uniformity is most essential. Fluctuations in the feed to screens may be compensated by installing screens of ample capacity to handle the peaks, or by additional storage ahead of the screens.

Storage for raw coal may be provided in a bin or in pit cars allotted to the preparation plant. Storage in pit cars at the dump has the advantages of flexibility in handling; reduced tendency to segregation by sizes that often occurs in bins; reduced degradation by handling; and better operating conditions for the raw-coal dumping and conveying equipment.

One disadvantage of the plan of storing sized coal, shown in Fig. 3, is the breakage to which the coal is subjected after it is sized and before it is delivered to the separators. The effect of this breakage on the performance of the separators will depend upon the nature of the coal. If the refuse material breaks up into fine particles, these will not be removed in the cleaning treatment and the finished product will be adversely affected. With the more normal condition, where the breakage

Fig. 4—Typical Layout Where Fines Are Re-treated



in handling is virtually all in the coal, no appreciable effect on cleaning performance will result.

Sizing required for a satisfactory feed to pneumatic cleaners varies greatly with the nature of the raw coal and the degree of cleaning desired. Experiment has shown that the presence of fine material in the feed to a table increases the range of sizes actually cleaned, even though the extremely fine material itself is not separated. There is, therefore, a certain advantage in treating the raw coal unsized, and re-treating the fines of the cleaned coal product from the primary operation. This plan of operation is shown in Fig. 4. It has the disadvantage of much rehandling and consequent degradation of the recleaned coal, and of increasing the load on the primary coarse-coal tables. The advisability of using this arrangement, therefore, depends upon the coal. Patently, it would not be suitable for a friable coal.

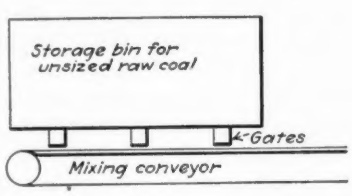


Fig. 5—Mixing Conveyors Give Tables Conditioned Feed

In large plants, the average performance when treating a wide range of sizes on the primary tables may be improved by taking a wide middlings cut and screening this material to a closer sizing schedule for final cleaning on separate tables. For example, the middlings from primary tables handling $\frac{1}{4}$x$1\frac{1}{4}$-in. feed may be separated into two sizes ($\frac{3}{4}$x$1\frac{1}{4}$ in. and $\frac{1}{4}$x$\frac{3}{4}$ in.) for separate re-treatment.

In a pneumatic separator depending upon stratification of the bed, the use of an unsized feed makes it possible to maintain a mobile condition of the pulp with less air than would be required to treat sized coal. This brings about a nearer approach to a hindered settling condition in the bed and increases the range of sizes handled. The layer of coal on the table deck has an important function in this case: it regulates and distributes the flow of air. The density of the pulp layer, therefore, is of great importance and the normal distribution of sizes is essential. Deck resistance may be adjusted to suit various types of coal but a certain quantity of fine material in the feed is necessary. Having adjusted other factors to the normal composition of the feed, a measure of uniformity in size composition and moisture content of the feed is necessary to maintain uniform results; otherwise, the bed may become too open or too dense and sluggish as conditions fluctuate. Conditioning of the feed in a plant treating the raw coal without prescreening thus implies mixing of the raw coal to assure a feed of uniform composition.

Use of large storage bins may contribute greatly to this disturbing irregularity in sizes delivered to the cleaners, because of the marked tendency of unsized material to segregate in handling. Complete control of the size composition of the feed could be obtained only by storage of sized coal as shown in Fig. 3, drawing out known proportions from each bin to a mixing conveyor feeding the separators. But this expedient is more costly than would be adopted except under unusual circumstances. Sufficient mixing should be obtained by a mixing conveyor which, receives coal simultaneously from several gates in the unsized raw coal storage bin, as shown in Fig. 5, or by dumping on two or more parallel tracks coal stored in cars, taken from different sections of the mine. In this arrangement cars may be dumped at a uniform rate to supply the separators with an uninterrupted feed through hoppers that are too small for size segregation by gravity flow.

Aside from its rôle as an undesirable impurity in the product, water in the coal treated in a pneumatic cleaning plant causes mechanical difficulties, chief of which are: (1) Blinding of screens reducing screening efficiency; (2) blinding of perforations in table decks; and (3) increased resistance to air flow through the pulp on a table deck, particularly when fine or unsized feeds are handled. Varying moisture content is particularly troublesome. Screens once blinded by wet coal are rendered ineffective even for screening dry coal that may subsequently come upon them. A run of wet coal disturbs the operation of a concentrator in which the air and the deck covering have been adjusted to handle dry coal. A uniformly damp coal, up to a limiting proportion of water, may be handled satisfactorily by adjusting the other factors.

The ideal condition of 0- to $\frac{1}{4}$-in. coal for treatment on the table has been found to be about 3 per cent in mechanical moisture content. In the natural mined product where the minus $\frac{1}{4}$-in. size has an average moisture content of 3 per cent, the distribution of moisture by sizes below $\frac{1}{4}$ in. will ordinarily be about as follows: Size $\frac{1}{4}$ in. to 14 mesh, $1\frac{1}{2}$ per cent; 14 to 28 mesh, 4 per cent; 28 to 48 mesh, 6 per cent; 48 to 100 mesh, 8 per cent; and 100 mesh to 0, 12 per cent.

This distribution of moisture greatly increases the difficulties in screening extremely fine sizes—say, $\frac{1}{16}$ in.—at the same time it increases the effectiveness of cleaning of fines in the unsized feed. This latter effect probably is due to the increased specific gravity of the moist, fine refuse and to the lessened aspirating effect of the dust hoods, which, in treating a bone dry coal, will take up much of the clean coal dust, leaving slate and clay dust in the table pulp.

Fine screens are more sensitive to the effect of small percentages of moisture than are the concentrators; and fine-coal tables or mixed-feed tables are more subject to fluctuations in resistance of the bed caused by moisture changes than are tables fed with sized grain coal.

A vibrating screen clothed with $\frac{1}{4}$-in. Ton-cap screen (apertures $\frac{1}{4}$ x $\frac{1}{2}$ in.) will operate satisfactorily on coal of up to 5 per cent mechanical moisture content. This feed, however, will blind a $\frac{1}{8}$-in. mesh cloth and will give some trouble on $\frac{3}{16}$-in. Six per cent moisture will not cause the $\frac{1}{4}$-in. cloth to blind but will greatly reduce the effectiveness of the screens. Table I gives the approximate effect of moisture content in the

Table I—Moisture Effect on Screen Efficiency*

Size of screen...	$\frac{1}{8}$ in.	$\frac{3}{16}$ in.	$\frac{1}{4}$ in.
Per Cent Moisture†	—Per Cent Removal of Undersize—		
2	95	95	95
3	60	75	85
4	20	50	70
5	Blind	20	40
6	.....	Blind	20

*Screen fed with maximum tonnage giving 95 per cent screening of dry coal.

†Mechanical moisture percentage—total moisture minus natural vein moisture content. Sizes of feed $\frac{3}{16}$ in. to 0.

feed on the effectiveness of screens. These figures apply to the use of the standard type of oblong-mesh cloth on vibrating screens. Sizes refer to net width of opening. Moisture percentages are mechanically held moisture above the natural seam moisture. The data are based on experience with Pittsburgh coal of about 1.2 per cent seam moisture. The efficiency figures express the percentage of re-

moval of available undersize material present in the unsized coal when the screen is fed at the rate that will give 95 per cent effectiveness with dry coal—initial condition shown in first line, 2 per cent moisture.

With moist coals, fairly complete screening can be obtained by increasing the screen area per ton of feed in inverse proportion to the above efficiency figures, but the size at which separation is actually made will be smaller than with dry coal on the same screen. As the moisture approaches the blinding point for any given size (in those parts of the table showing efficiencies below 50), close sizing becomes impracticable with any amount of screen area.

Mixing of coal in bins is of little advantage in handling wet and dry coal, because the moisture does not distribute itself through the mixed mass of coal to any great extent. Predrying of the raw coal offers the most positive solution of the difficulty. Operation of a dryer in this service will differ markedly from the drying of wet washed coal in that the feed to the dryer will vary in moisture content and a much smaller reduction in moisture content will be required.

Table II—Capacity of Air Circulation Type of Dryer*

Temperature in Dryer Initial	Temperature in Dryer Discharge	Weight of Moisture Absorbed per Lb. Air, Grains	Cu.Ft. Air for 20 Lb. Water Removal
100	68.7	51.2	36,900
120	74.5	74.5	25,400
140	79.6	99.5	19,000
160	84.3	125.0	15,100
180	88.4	151.0	12,500
200	92.3	178.5	10,600

*Assuming air enters heater at 70 deg. F. and 50 per cent relative humidity.

For these reasons, the regulation of a high-temperature direct heat dryer would be extremely difficult. The small quantity of water to be evaporated in most cases would make it feasible to use a dryer at sufficiently low temperature to avoid burning dry coal. In the usual case, removal of a fraction of a per cent to 2 or 3 per cent of moisture will eliminate operating troubles that arise from wet coal in the plant feed. The figures given in Table II, showing the amount of air at different temperatures theoretically required to carry away 20 lb. of water, equivalent to 1 per cent moisture in a ton of coal, indicates the air circulation required in such a dryer. These figures are based on 100 per cent relative humidity in the discharge from the dryer, which is not practicable in operation. Hence air consumptions in practice would be some 50 per cent greater than is shown in the table.

Predrying has the additional advantage of turning out a uniformly dry final product. With the raw coal conditioned by drying and subsequent complete screening, the dry preparation plant will produce a cleaned fuel, low in ash, sulphur, and water.

An important factor in servicing the preparation plant is a close coordination of mining and preparation activities. Where difficulty is experienced by reason of wet coal in the feed, much may often be accomplished in the mine to remedy the condition at the source. Wet places may be eliminated by local drainage and a change in haulage schedules may be feasible to avoid wetting of trips left on outside haulage roads at the end of a shift. When wet coal can be eliminated in the mine, this is the most economical solution. In any case, a careful study of conditions and methods of working at the face may enable the mine force to produce a raw material more suited to effective treatment in the preparation plant.

This kind of co-operation will sometimes be difficult to establish, because production has always had the right of way over all other objectives in the underground organization and any interference with the established routine for any outside purpose may be expected to meet with some opposition. But as the production of marketable coal is fast becoming a manufacturing process, the mine ceases to be a complete independent unit and becomes a source of raw material which is manufactured into a finished market product in the preparation plant. It will take some time for the mine management to completely recognize this new alignment.

Irregular delivery of coal from the mine is aggravated in most cases by the chronic shortage of cars which has always necessitated subservience of all other interests to the paramount object of dumping cars at record speed and getting them back into the mine. This ever-present bone of contention between the mine and preparation plant operators could be eliminated by adequate car supply, with the provision of extra pit cars allotted to the preparation plant in lieu of other storage equipment, to be held when necessary on the storage track at the dumping point.

Uniform, uninterrupted feed is essential to the most effective operation of any gravity concentrator depending upon the stratification of the feed pulp in the machine. Retention of a certain quantity of bed slate on the separator is necessary to make a good refuse product. A uniform depth and density of moving pulp on the separating surface also is essential to proper regulation of the current, whether this be air or water. Some experimental data showing the adverse effect on cleaning performance of an air table caused by stopping and starting of the feed during operation are given in Table III. These results were obtained with a table handling $\frac{7}{16}$ x $1\frac{1}{8}$-in. coal containing about 7 per cent of refuse heavier than 1.6 sp.gr.

Table III—Irregularities in Table Performance Caused by Intermittent Feeding

	Condition I	Condition II	Condition III
Per cent sink in cleaned coal.....	1.3	7.3	2.0
Per cent float in refuse..........	9.8	56.0	21.6

Note: Condition I with uniform constant feed; Condition II during 1 minute after starting, following a stop in the feed; Condition III average of actual operation including irregular stops. Float-and-sink tests at 1.6 sp. gr.

Other factors of importance in the dry treatment of coal are a plant well designed and constructed to assure the minimum of interruption due to failure of coal handling equipment; adequate light and space for convenient operation and repair of equipment; cleanly and orderly maintenance; intelligent and well-trained attendants; and analytical control of the plant, with daily posting of results for the information of plant operators.

The operation of a gravity concentrator is an art. It cannot be entirely regulated mechanically, no matter how complete and expensive the equipment; nor can it be intrusted to the care of unskilled or uninterested workmen. No entirely automatic control has yet been devised to work satisfactorily, but all concentrating devices give their best results under the care of a long-experienced and interested operator who is able to "sense" certain maladjustments and their effects on performance. In this respect the cleaning plant presents certain operating problems different from other mechanical equipment in more common use at bituminous mines. Recognition of this factor and the introduction of systematic control and information for machine operators have resulted in striking improvement in cleaning performance in some instances.

CLOSE SIZING NOW

+ Is Mechanical Cleaning Next in Illinois?

By DAVID R. MITCHELL

Urbana, Ill.

CONSIDERING that in 1908 Illinois outranked all other states in the quantity of coal washed and that 85 washing plants were reported in 1912, one is rather startled by the fact that mechanical cleaning has almost entirely disappeared from this state. Two reasons are apparent for this change: The first, and probably the most important, is that immense areas of comparatively clean coal have been developed; the second is that many of the early washing plants were inefficient.

Preparation at the present consists almost entirely of sizing and hand-picking. Because domestic sizes bring at least $1 per ton more than screenings, an attempt is made to get the greatest possible production of prepared sizes by screening, with as little breakage as is consistent with economical operation. Included in the preparation objectives is the removal of extraneous ash and sulphur. An important problem facing the operators is the utilization of low-priced screenings.

As more than 50 per cent of the production goes to domestic trade, sizing screens have been adopted generally. The very hardness of these coals makes it comparatively easy, with due precautions, to size them without any great degradation. Improvements in sizing practices have tended toward the elimination of breakage still further. Screens in modern installations are set nearly horizontal and take out the coarser sizes first. Finally, the conveyances carry the coal gently. Though considerable improvement has been made in these respects, there is room for still more.

Abstract of paper presented at the Pittsburgh meeting of the A.I.M.E., Sept. 11.

Most of the tipples are equipped for hand-picking the larger sizes. However, it appears that this does no more than improve the appearance of the coal. Table I gives variations in ash and sulphur of 6-in. moisture-free lump samples carefully selected at three mines; these were taken from loading booms over a period of at least one day, and represent closely the daily average for each mine. Simultaneously, lumps were picked from railroad cars. Lumps picked from railroad cars were classified as good, medium, and poor. The main samples were carefully hand-picked in the laboratory to determine what further reduction of ash could be made by this method. A study of this table clearly shows the difficulty of judging visually the ash content of a lump shipment.

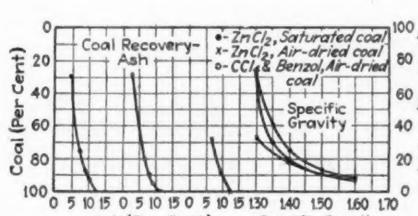


Fig. 1—Curves of Float-and-Sink Tests on Saturated Coal and Air-Dried Coal

Taking into account the amount of coal that had to be discarded, the actual ash reduction from hand-picking was small. This would lead to the conclusion that picking of the 6-in. lump coal does little more than help its appearance. The extreme variation in good and poor lump is noteworthy, particularly as the samples were picked from coal that had gone over picking tables. In the case of Mine No. 2 the lumps selected as good showed a higher ash content than those selected as average. Discarded lumps were not sufficiently high in ash to classify as refuse free of coal. A considerable saving of coal could be effected by crushing and further cleaning these discarded lumps.

Clay, pyrite, calcite, and gypsum are the common impurities in the coal of this state. Analyses of the ash content of these impurities and of the constituents in coal from the Western Illinois No. 5 seam are given in Table II. It is apparent that fusain in this case should be classed as an impurity. Where the luster of this coal is predominantly bright, the coal will be

Table I—Variations in Ash and Sulphur of 6-in. Lump on Moisture-Free Basis

	Mine 1		Mine 2			Mine 3		
	Ash, Per Cent	S, Per Cent	Ash, Per Cent	S, Per Cent	Percentage of Total Sample	Ash, Per Cent	S, Per Cent	Percentage of Total Sample
Selected good lump	14.2	2.4	5.9	1.2	....	12.1	3.1	....
Selected average lump	15.6	3.1	5.6	0.9	....	15.8	5.5	....
Selected poor lump	24.8	6.9	17.7	0.7	....	34.6	8.6	....
Selected poor lump	18.5	2.9	....	....	....	....	....	....
Sample of 3000 lb	15.1	3.5	8.0	0.7	100.0	11.7	4.4	100.0
Handpicked—clean	....	....	6.6	0.7	88.2	10.9	3.7	92.0
Handpicked—refuse	....	....	17.8	0.9	11.8	20.2	12.8	8.0

Table II—Ash Content of Coal Constituents and Associated Impurities in Western Illinois No. 5 Coal

Constituent or Impurity	Ash, Per Cent
Bright coal (anthraxylon)	4.8
Dull coal (attritus)	11.9
Fusain (mineral charcoal)	34.4
Pyrite	59.2
Clay	69.5
Shale	74.2

high grade; where the luster is dull, it will be low grade.

Fusain is usually soft and friable, as are clay and some of the associated shales found with Illinois coals. As these are generally concentrated in the finer sizes, their removal constitutes a considerable cleaning problem. In general, the finer the sizes, the greater the percentages of ash and sulphur in the coals from this field.

Table III gives a detailed screen analysis of a southern Illinois coal. This is a relatively clean coal and the increase in ash in the smallest sizes is due almost entirely to a concentration of high ash fusain in these sizes. This concentration complicates the cleaning because fusain tends to concentrate in the sludge of a wet washing plant and in the dust of a pneumatic plant. While this occurrence of fusain is common, in most of the coals the increase in ash in the finer sizes begins at a higher size limit than is noted in the example given, on account of the presence of friable bands of shale, clay, pyrite, calcite, and fusain. In many of the coals the increase starts at about ¾ in. and continues down to the finest dust.

Moisture in coal raises important problems connected with marketing and cleaning. The water content of Illinois coals varies from a low of 5 per cent to a high of 18 per cent. This is not moisture-producing wetness, but normal moisture content which leaves the coal in a dry and dusty condition as it leaves the mine. Generally, the coal contains less moisture after shipment than before, and so when it is purchased on the basis of heat value or ash content, evaluation is somewhat difficult. Yet moisture is an incombustible which cannot be, or at least is not, removed to any extent by preparation processes.

Changes in moisture affect the specific gravity of coal particles used in washability tests. The writer has found as much as 0.15 difference in the specific gravity as between air-dried coal and fresh coal. A third condition enters into the problem of float-and-sink testing when organic solutions are used. In making washability tests, it is common practice to test large sizes with zinc chloride solutions and the finer sizes with solutions of carbon tetrachloride and benzol, or carbon tetrachloride and bromoform. A composite of these results is made to get a picture of the washability of the coal as a whole. The question arises: Is it safe to make a composite of, or to compare, float-and-sink determinations on different sizes of coal, using aqueous solutions for some sizes and organic solutions for others?

To obtain definite information on this phase of the problem, tests were made on a sample of coal having a normal coal-bed moisture of about 15 per cent, noting the rate of increase in specific gravity of the particles when suspended in water and in organic solutions of carbon tetrachloride and benzol. The final specific gravities were nearly the same in each case, but the organic liquids were absorbed much faster than water. At the end of 20 minutes the coal samples in organic liquids apparently had absorbed all of the solution they could take in. A much longer time was needed for samples suspended in water, some increasing in weight for 12 hours before becoming stable.

Table III—Screen Analyses of Southern Illinois No. 6 Coal

Size	Percentage of Total	Moisture-free Ash, Per Cent	Moisture-free Sulphur, Per Cent
6-in. lump	12.6	8.0	0.7
Inches			
6×3	20.3	7.0	0.9
3×1¼	17.2	8.3	0.8
1¼×¾	15.3	8.6	0.8
¾×⅜	5.9	8.5	0.8
⅜×3/16	11.5	9.2	0.9
3/16×10 mesh	5.8	8.7	0.9
10×20 mesh	4.6	8.0	0.8
20×48 mesh	4.0	12.4	0.8
48×0 mesh	2.8	17.2	0.8
Total and average	100	8.6	0.8

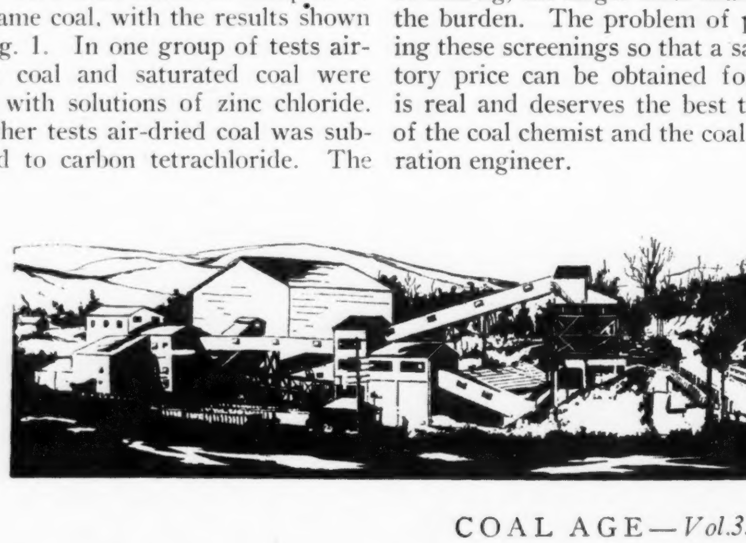
Actual float-and-sink determinations were then made on samples of the same coal, with the results shown in Fig. 1. In one group of tests air-dried coal and saturated coal were used with solutions of zinc chloride. In other tests air-dried coal was subjected to carbon tetrachloride. The two samples tested with zinc chloride solutions had an average ash content of 13 and 12.8 per cent respectively; that tested with carbon tetrachloride had an average ash content of 11.8 per cent.

In cutting out this last sample an error of approximately 1 per cent occurred as compared with the other two, which checked almost exactly. The curves show that recoveries from carbon tetrachloride on air-dried coal closely agree with those from zinc chloride on saturated coal. But there is a great difference between the results obtained with zinc chloride on saturated coal and on thoroughly air-dried coal—as much as 40 per cent at 1.30 specific gravity.

The coal to be tested by aqueous solutions should always be brought to the same condition of moisture content before being tested. Moisture determinations should be made and all results calculated to a moisture-free basis. Coal subjected to organic solutions should first be thoroughly air dried. The results then will be comparable to those obtained by using aqueous solutions on saturated coal. Such results can be combined into an accurate composite for any group of sizes desired.

For most of the high-sulphur coals of Illinois no great reduction in sulphur is possible, because about half of it is of the organic form. It is recommended that chemical analysis of face samples be made for the various forms of sulphur before any extended washability studies are made or before a cleaning plant is erected. In years past such plants were built for the express purpose of removing unremovable sulphur.

Of the 61,000,000 tons produced in Illinois in 1929, 17,500,000 tons was screenings or sizes finer than chestnut, high in ash, and fairly often high in sulphur. As these are quoted on the market much below the cost of mining, the larger sizes must carry the burden. The problem of preparing these screenings so that a satisfactory price can be obtained for them is real and deserves the best thought of the coal chemist and the coal preparation engineer.



CLOSED CIRCUITS

+ Favored in Pneumatic Cleaning

By CHARLES H. J. PATTERSON

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WHEN coal is deposited on the decks of pneumatic tables, all fine particles clinging to the larger pieces are blown free by the air. Inasmuch as the air retains an appreciable residual velocity after passing through the bed of coal, it is capable of suspending particles of goodly size. This velocity is dissipated gradually and can, unless confined, readily extend beyond the limits of the plant. Today the ideal in the design and operation of pneumatic cleaning plants is not that they be no dustier than the ordinary tipple but rather that they be as clean as an office or shop. This degree of perfection may not yet have been attained in any commercial plant, but it is not impossible of achievement.

Not until recently has the recirculation principle been applied to pneumatic separating plants. In my estimation it has not yet been proved entirely satisfactory in commercial installations. A serious obstacle lies in the fact that it is practically impossible to provide a truly closed circuit. The air circuits must be interrupted at certain points, if only for the introduction of raw material and for the recovery of the finished product. Nevertheless, it is feasible to prevent the escape of polluted air at these points, but this can scarcely be accomplished without admitting additional air into the circuit. These additions of air are cumulative, which necessitates means for emitting to the atmosphere the excess while still carrying its objectionable burden, if provisions are not made for conditioning. If it must be provided at all, conditioning frequently is simpler and more economical if applied to the entire volume of air involved. This procedure eliminates the extra initial cost and operating expense of the closed system.

The first noteworthy commercial installation of pneumatic equipment was made in 1922, at the Crane Creek plant of the American Coal Company of Allegany County, at McComas, W. Va. Six tables for cleaning coal between the limits of $\frac{1}{8}$ and 3 in. comprised the initial installation. Dust was collected by hoods connected by a system of ducts to exhauster fans. In this installation the unit dust burden was small, because of the removal of fines from the feed by vibrating screens.

After about a year of satisfactory operation, it was decided to extend the treatment to minus $\frac{1}{8}$-in. coal, and five additional tables of the Y-type were added. As these had relatively doubled the coal-cleaning capacity, with no proportionate increase in the quantity of air required, the dust burden of the air was increased many times as compared with the operation of the tables used on the larger coal.

Conditions were further aggravated by the use of aspirators to remove a large proportion of the fine dust from the coal before delivery to the tables. These were intended to give greater capacity to the tables in the cleaning of larger particles, on the assumption that the finest coal received no beneficial treatment on the decks. The final result was so to increase the dust escaping from the collectors as to render working conditions unendurable and adjacent residences unfit for human habitation. Incidentally aspirators are not being used in any of the recently erected plants in the United States; however, they are still being employed in Canada, Australia, and Great Britain.

When it became evident that the methods employed in the original dust-collecting installation could not adequately cope with the altered conditions, a new piping system was installed by the B. F. Sturtevant Co. The investigations attendant on this last installation at McComas constitute in a large degree the basis of later study and development; yet today this plant is by no means modern in the matter of dust collection.

Until recently, hoods for separators treating coal larger than $\frac{1}{8}$ in. were designed with open chimneys at the end farthest away from the feeding point of the table. This type is now obsolete in this country, the present tendency being toward totally inclosed equipment throughout the plant.

That the extremely fine "air float" particles in the smaller sizes cannot be reclaimed satisfactorily in centrifugal collectors is the most important lesson learned from the Crane Creek experience. The external discharge from the plant using such a system is highly objectionable, though the interior conditions may be ideal. Filters employing cloth or other fine-mesh fabric, similar to those used in other industries, were considered at an early stage. These were intended for use where relatively small air volumes are employed. If utilized in connection with large volumes the cost of these filters would have been prohibitive. Not only would they have complicated the plant but, as direct filters, they would have been subjected to quick ruination by the abrasive action of dust particles at high velocities.

With filters apparently demon-

Abstract of paper delivered at Pittsburgh meeting of the A.I.M.E., Sept. 11.

strated as not feasible, investigations were inaugurated in other directions. Scrubbing by jets and screens of water and treatment with live steam were tried. Among other reasons for their failure, water processes produced a sludge, and this offset one of the frequently quoted advantages of dry cleaning over wet processes.

Investigations meanwhile conducted in England met with a greater measure of success. Centrifugal collectors were never seriously considered and complete removal of dust by filtration was held a primary requirement, owing to statutory restrictions on industrial discharges. A simple process, adequate and economical, was finally evolved by the Birtley Iron Co., Ltd. It was first installed in the Wardley plant of Messrs. John Bowes and Partners, Ltd., the first British plant to treat coal smaller than ⅛ in., and has now been in operation about three years. Since, similar equipment has been used in many plants in Europe, Australia, and America. This system is used by the American Coal Cleaning Corporation.

It consists essentially of a precipitation chamber which receives the dust-laden air from the exhauster. Perforated plates form the floor of this chamber, and beneath each perforation is suspended a cylindrical filter tube formed of a fine-mesh fabric. These tubes connect with bins which otherwise are entirely inclosed except for valves for the withdrawal of dust.

In operation, the dust-impregnated air, entering the large expansion chamber at high velocity, quickly becomes almost motionless. The velocity of escape through the fabric is never more than 1/750 of the entering speed. With the velocity dissipated, all but the extremely fine particles fall through the tubes to the dust bins below and the removal of the air-float residue constitutes the only actual filtering performed.

A film of dust finer than 100 mesh forms as a protective lining on the inside of the tubes and assists them in filtering, much as the *schmutzdecks* of the Imhoff sewage filter. As the thickness of this dust lining maintains a static balance, rapping devices and air reversal arrangements are unnecessary. The fabric used in the tubes is a standard English weave which permits no dust leakage and holds a back pressure in a static state indefinitely, once that pressure is established.

A new system combining filtration with centrifugal collection has been introduced recently by the Birtley company. Unfortunately, detailed information is not available at this time.

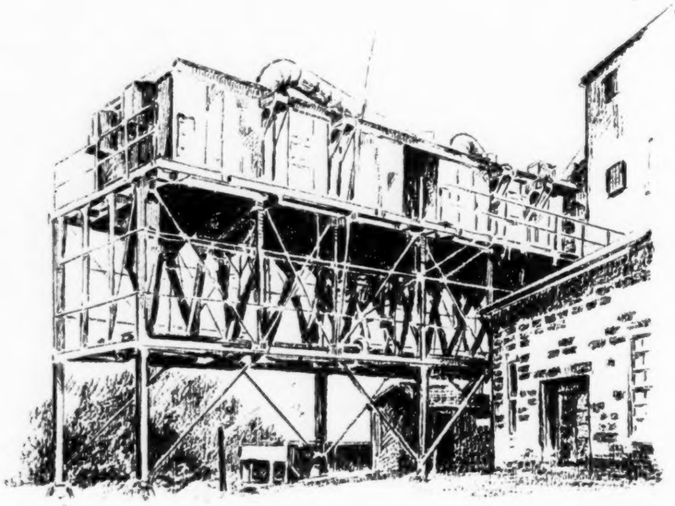
Several all-metal systems, chiefly of the compounded centrifugal collector type, are now obtainable. Of these systems, all which use ducts for collecting dust-laden air practically follow the specifications determined upon in the Crane Creek installation.

A new type of collector offered by the American Blower Co. is reported to have shown high efficiencies with various intensities of coal dust. However, the initial cost is quite high; the resistance also is high and appreciably increases the power consumption.

The Pangborn dust arrester, a cloth-screen-type filter, is now being produced in comparatively large units, which are readily combinable in rows for multiple installation. Motor-driven screen shakers and solenoid-operated air-reversing mechanisms prevent ultimate blinding of the screens. In this system the overall resistance is somewhat higher than the process last described. The largest installation of this equipment is at the Jerome (Pa.) plant of the Hillman Coal & Coke Co., which has a cleaning-plant capacity of 200 tons per hour and uses over 100,000 cu.ft. of filtered air per minute, it is said.

In the Peale-Davis system, dust is collected in a huge expansion compartment located above the plant. As the bottom of this chamber almost completely incloses the decks of the tables, all the air coming through the deck will enter the chamber. Hoppers are provided to receive the dust which precipitates as the velocity of the air is expanded in the large expansion zone. It is hardly conceivable that the extreme fines will precipitate in an expansion chamber of any reasonable size, but it is, of course, practicable to combine some type of filtering system where complete recovery is essential. The air volumes required for treating 4x0-in. coal are so great in proportion to the quantity of the finest dust that the unit dust burden is not nearly so great as the processes treating ⅛-in. coal separately.

For volumes of 25,000 cu.ft. per minute or less, the larger sizes of planing-mill-type exhausters are generally used. These are rugged in construction and do not consume power excessively; but they are not made with wheels larger in diameter than 7 or 8 ft. In some instances, it is advantageous to split the system into two or more independent circuits, but this inevitably results in increased initial cost and operating expense. Because of these facts, the so-called multivane types of fans are coming to be regarded as standard practice for large air volumes. Though these are not constructed so ruggedly as the planing-mill type, the units in use for several years show no serious wear and have effected economies in power consumption.



"QUALITY"

+ Is Watchword in Preparation At New Dorrance Washery

By EDGAR SCHWEITZER

Assistant Mechanical Engineer, Lehigh Valley Coal Co., Wilkes-Barre, Pa.

IN ARRIVING at a decision as to the kind of preparation system installed at its Dorrance colliery, the Lehigh Valley Coal Co. investigated all the practical methods being used in the anthracite field. The Rheolaveur system was finally chosen, largely on the strength of the experience gained from the operation of a Rheo experimental plant which was run for two years in parallel with a jig plant in the Hazleton shaft breaker.

Dorrance is designed for 3,000 tons per 8-hour day. It replaced a breaker in which preparation was accomplished by shaking screens, by Pardee spiral pickers for coal between the limits of egg and pea, and by hand-picking.

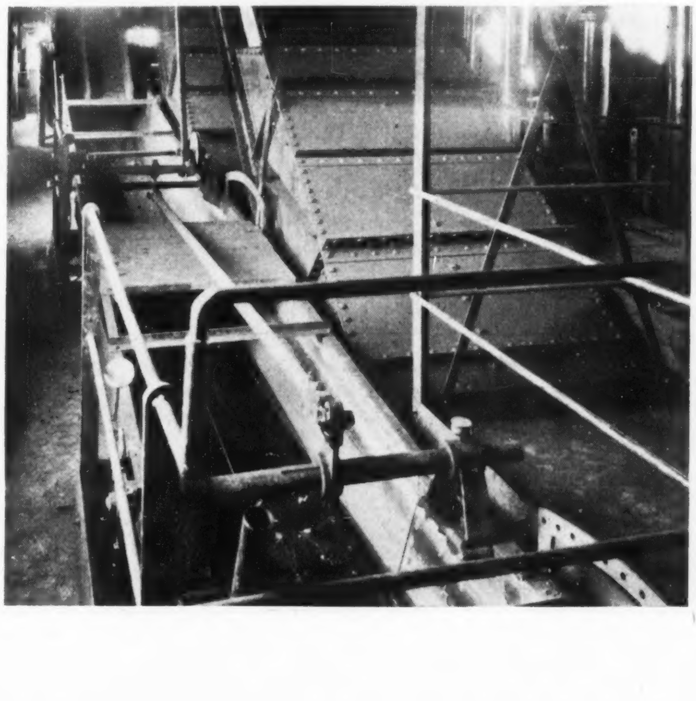
Results from the experimental unit showed an increase of about 2.2 per cent in prepared sizes over the yield from the jig plant, equivalent to an increased realization of about $35,000 per year and an estimated saving in labor of around $30,000 per year. It was estimated that the first cost of a Rheo plant would be less than a jig installation and as cheap as any other system; also that the operation cost, as well as the loss due to degradation, would be no greater and probably less than the other systems investigated.

An analysis of the probable mine-run feed was made by selecting mine cars of coal from each of the seven veins mined. By visual inspection, the products were divided into coal and refuse. Sizes larger than egg were broken down to egg and smaller in the preparation of a composite sample, taking quantities proportional to the tonnage being mined from the respective seams and proportional to the actual weights of the several materials in the mine cars. The sample was screened into sizes and float-and-sink tests conducted with specific gravities up to 2. Indications were that a recovery at 1.90 specific gravity would be practical and result in approximately 10 to 12 per cent ash coal. After the laboratory tests, the sized samples were submitted to a company coal inspector for hand-picking to determine exactly what material he would accept as coal and reject as refuse.

It was interesting to note that the inspector's results checked within 1 per cent of the sink-and-float tests, and that a recovery at 1.9 specific gravity would, in his opinion, produce a satisfactory product. In practice, it has been found necessary to reduce that limit, due to an increasing critical market, to around 1.65 to 1.70 sp.gr. This desire to manufacture a quality anthracite instead of an anthracite combustible caused an estimated loss in 1929 of 39,000 tons of combustible material, or about $300,000, in domestic sizes alone.

Run-of-mine feed to the plant contains about 8 per cent of slate refuse plus the relatively light gravity material of 1.70 to 1.90 sp.gr. which consists of bone coal, laminated pieces, half and half, and capped coal. Some

Primary Washing Launder, Rewash Launder, and Sealed Boot Conveyor



Abstract of paper presented Sept. 11 before the A.I.M.E. in Pittsburgh, Pa.

Table I—Attendant Labor Comparison, Old and New Plants

	Dry Breaker	Rheo
Preparation		
Breaker boss	1	1
Ticket taker	1	2
Dumpers	2	2
Plate men	13	2
Pickers pure coal	7	3
Pickers refuse	5	..
Machinery operators	2	..
Machinery attendants	2	7
Oilers	2	..
Picker boss	1	..
Cleaners	2	2
Engineer	1	..
Laborers	4	2
Group total	43	21
Loaders		
Box car loaders	4	1
Coal car loaders	4	2
Car runners	1	3
Car cleaners	4	5
Retail	1	1
Boss	1	1
Group total	15	13
Transportation		
Engineers	11	11
Locomotive engineers	4	2
Headmen	9	0
Runners	3	0
Oilers	3	0
Track repairmen	2	2
Group total	32	15
Grand total	95	52
Miscellaneous		
Carpenters	2	0
Machine attendants*	*2	2
Laborer*	1	1
Group total	3	3
Grand total	95	52

*On refuse.

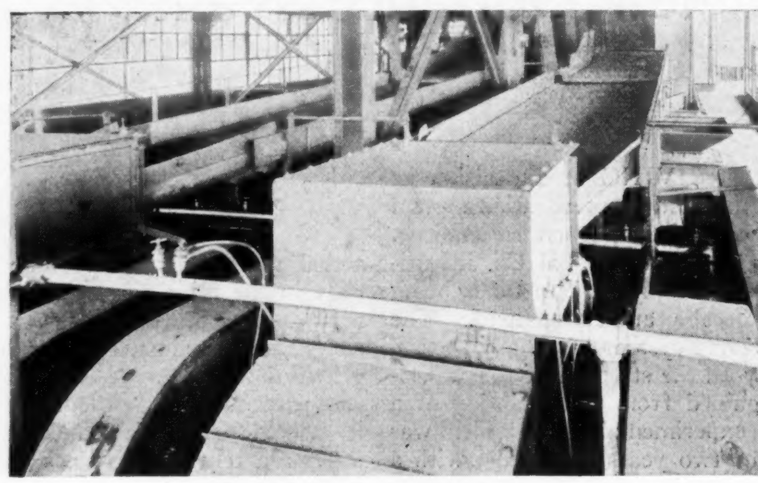
At this plant coal is hoisted in a four-compartment shaft and dumped into reciprocating feeders delivering onto a 42-in. belt conveyor on 660-ft. centers, running from shaft to breaker. Plus 6 in. is screened out and inspected by two men, who remove only pure rock. This oversize is broken down and, together with all the minus 3⅜ in. from the mine-run, is collected in a 100-ton storage pocket and delivered by feeders to two primary 32-in. two-box Rheo launders. Slate and bone discharged by No. 1 box is sent to a 24-in. two-box rewashing launder, and the light bone middlings discharged from No. 2 box are returned to the primary launder to create an artificial bed between the coal and slate. Separation at No. 2 box, therefore, is between coal and bone and results in a cut at the desired gravity.

Table IV—Percentage of Condemned Coal to Total Loaded, by Months

	Railroad Cars Loaded	Condemned for— Slate	Slate and Bone	Bone
January	279	0.72	1.61	6.63
February	995	0.70	2.96	5.07
March	871	0.46	3.85	11.71
April	599	....	1.09	2.92
May	1,130	0.09	0.27	3.27
June	1,150	....	0.30	0.87

The rewash launder operates in a similar manner. Box No. 4 returns the middlings, while Box No. 3 discharges slate and heavy bone to a 20-in. two-box slate rewash launder. No. 5 box discharges the final refuse onto a refuse shaker, where the minus $\frac{5}{16}$ in. is sized out and returned to the launder for bedding; discharge from the No. 6 box is returned to the launder as middlings. Heavy material passing over the slate rewash is screened, the size of mesh depending on the quality of the material. Oversize—usually plus ¾ in.—is broken down to minus $1\frac{9}{16}$ in. and returned to the storage pocket for mixing with mine-run. The product passing through the primary launders and the rewash is sized into egg, stove, nut, pea, and buckwheat sizes, and then delivered to storage pockets. Minus $\frac{5}{16}$ in. is collected in a fine-coal elevator pit and raised to the rice and barley screens. Minus $\frac{1}{16}$ in. or minus $\frac{3}{32}$ in. is treated in a Dorr classifier; but if there is no market, after settling in a Dorr thickener, it is silted into the mines together with pulverized breaker refuse.

Water used for washing is returned to the thickener, from which it overflows into the sump of a circulating pump. The only water lost is that which runs off during the loading of



Tables for Hand-picking of Sized Coal Before Crushing and Washing

light bone, which floats at 1.58 gravity, is condemned for appearance. It is lighter than the coal, difficult to wash and, when it is in excess of the amount allowed in the market product, must be hand picked.

Table II—Percentages of Grades 1, 2 and 3, Half-and-Half, Bone, and Slate in the Feed at Various Sink and Floats

Grades	Float 1.60	1.60 1.65	1.65 1.70	1.70 1.75	1.75 1.90	Sink 1.90	Total
Egg							
No. 1 coal	60.29	.....	....	....	0.14	....	60.43
No. 2 coal	13.18	1.71	0.7	....	....	....	15.59
No. 3 coal	4.00	1.44	2.22	0.21	0.16	....	8.03
Half-and-half	0.58	0.72	0.53	2.08	3.44	....	7.36
Bone	0.19	.....	1.85	....	0.53	....	2.57
Slate	.....	.....	....	....	1.14	4.89	6.03
Stove							
No. 1 coal	.....	66.28	0.39	....	....	0.05	66.72
No. 2 coal	.....	8.68	1.72	0.08	....	....	10.48
No. 3 coal	.....	1.48	1.37	0.44	0.24	....	3.53
Half-and-half	.....	3.11	0.73	0.65	0.46	....	4.95
Bone	.....	0.28	1.92	0.89	0.57	....	3.66
Slate	.....	.....	....	0.75	0.37	9.54	10.66
Nut							
Coal	.....	89.13	0.71	....	....	....	89.84
Half and half	.....	0.73	....	....	0.77	0.29	1.79
Bone	.....	0.14	....	....	0.72	0.05	0.91
Slate	.....	.....	....	....	0.27	7.19	7.46

Table III—Percentage of Coal in the Total Refuse by Sizes as Determined by Sampling

	Broken Coal	Broken Chipped Coal	Egg	Egg	Stove	Stove	Nut	Pea	Buck	Rice	Total Coal	Total Chipped Coal
January	0.195	0.302	1.28	0.79	1.35	0.49	1.69	0.79	0.18	0.074	5.56	1.58
February	0.158	0.17	1.30	0.79	1.01	0.49	1.18	0.77	0.28	0.15	4.86	1.46
March	0.078	0.125	1.80	0.92	1.84	0.63	3.89	2.32	0.93	0.52	11.405	1.68
April	0.029	0.002	1.21	0.73	0.95	0.29	2.30	1.86	1.07	0.64	8.07	1.02
May	0.00	0.008	1.08	1.19	0.89	0.63	1.43	1.09	0.66	0.66	5.82	1.83
June	0.00	0.001	0.21	1.02	0.53	0.57	1.52	1.38	0.88	0.68	5.21	1.59
July	0.00	1.08	1.31	2.94	1.92	2.31	4.67	17.1	21.4	24.00	....	.....

Table V—Number of Cars Condemned and Cause

	Railroad Cars Loaded	Slate	Bone	Over-size	Under-size	Break-age	Appear-ance
January	279	6½	18½	4	2	1	0
February	995	36½	50½	10	13	3	0
March	871	37½	102	0	3½	1½	...
April	599	6½	21	..	4	0	3
May	1,130	3	35	0	6	7	12½
June	1,150	3½	8½	5	11	5	1

coal into railroad cars (about 400 gal. per minute), the underflow from the thickener, and a small amount used in the refuse pulverizers. Make-up water, amounting to 1,200 g.p.m., is pumped from the Susquehanna into a fresh-water storage tank and is used only to spray the coal on the sizing shakers and that on the booms during loading. Control of the circulating and make-up water is an important part of the system. Dorrance colliery is located within the city of Wilkes-Barre, where land is valuable and none available for outside refuse storage. Consequently, the entire discharge from the breaker must be run into the mine through a borehole.

Five hundred and forty tons of steel was used in the construction of this washery which has a volumetric size of 616,000 cu.ft. Compare this with a jig plant of 2,500 tons daily capacity containing 1,424,240 cu.ft. and constructed of 1,315 tons of steel, and with another plant of 2,500 tons daily capacity equipped with the sand-flotation process, which houses 1,080,000 cu.ft. and has 1,020 tons of steel in its structure.

Table VI—Standards Used by the Inspection Department

Size	Percentages Effective 2/19/30 Slate	Percentages Effective 2/19/30 Bone	Percentages Effective 3/17/30 Slate	Percentages Effective 3/17/30 Bone
Broken	1.0	1.0	1.0	1.0
Egg	1.5	2.5	1.5	2.0
Stove	2.5	4.0	2.0	3.0
Nut	3.0	4.0	2.0	4.0

Construction was started in May, 1929, but because the old breaker could not be abandoned until the new one was started, and because the new plant was to occupy a portion of the old breaker site, construction was slow. On Jan. 16 the new plant took part of the coal; it was not until May 15 that the plant was completed and handled the entire mine production.

The most direct gain made by the new washery over the old dry breaker was the reduction in labor of 43 men. Table I gives a comparison of the respective crews.

Table VII—Power Consumption and Tonnage Produced

		March	April	May	June	July
Kw. hr. (440 volts)	Head house	27,300	21,300	31,700	26,800	28,200
	Washer, including river pumps	45,800	40,800	61,700	56,200	55,000
	Screening and loading	12,100	9,700	16,100	15,100	15,500
	Total	85,200	71,800	109,500	98,100	98,700
Tons shipped		35,231	34,629	56,722	53,259	55,477
Kw.-hr. per ton		2.42	2.08	1.93	1.84	1.78
Total kw.-hr. (11,000 volts)		90,150	81,400	114,200	100,500	99,800
Cost per kw.-hr. (cents)		1.05	1.073	0.922	0.978	0.967
Demand kw		600	600	600	600	600
Load Factor (24 hr.)		21.1	18.9	26.5	23.3	23.0
Breaker starts		19	17	26	23	24

In the preparation group, the seven men listed as machinery attendants are in charge of the washing equipment and tributary machines. They are all paid the same rate and are assigned to no particular position. In consequence they can be shifted from one job to another without any trouble. This is a new arrangement, but is working out well.

It is rumored that Dorrance coal is easy to prepare, but the contrary is the fact. Its preparation is difficult because so much bone or laminated material which is lighter than coal passes through the launder. There is no gravity machine that will move light material into the refuse and pass heavier pieces into the coal. Our coal inspector classifies coal into grades 1, 2, and 3. He will accept in the railroad cars, a small amount of the second and less of the third grade coal. To produce quality anthracite it is necessary to hand-pick broken and egg sizes to remove pieces that would look bad to the customer, yet would not impair combustion.

Loading Conveyor Gallery

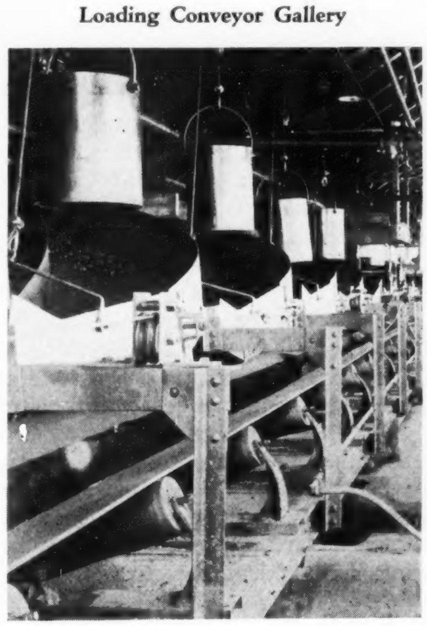


Table II shows the overlapping of the various grades and indicates washing difficulties. Coals of the second and third grades are of good quality but lack the luster or brilliancy of the first grade. As a matter of fact, there is only a slight difference between the grades and it is extremely difficult to classify them correctly. Only an experienced inspector can do that.

With the various grades and the perfection in appearance demanded by the trade, to contend with, while the plant was being adjusted to wash coal satisfactorily with a low percentage of coal in the refuse (see Table III), condemned coal was to be expected. But the percentage has been reduced in each succeeding month and now it is almost negligible. There are days when the mine-run feed is high in bone coal, and on these days the percentage of condemned coal is up. But on the whole condemnation is satisfactorily low (see Tables IV, V, and VI).

The plant is electrically operated, using purchased power and individual drives. Its total connected load, including the pump furnishing make-up water, is 1,100 hp. For further information and related data concerning power consumption see Table VII.

CLOSER CONTROL

+ Of Sand Flotation System Developed by Hourly Plant Tests

By JOHN F. McLAUGHLIN

Assistant Superintendent of Preparation, Hudson Coal Co., Scranton, Pa.

PREPARATION of anthracite by the Chance process has demonstrated the need for some means other than the wooden-ball system for determining the specific gravity of the fluid mass in the separating cone. With this system the margin of error was great, because the ball might be held in suspension and carried around by material floating beneath the surface in what is known as "island" formation, which results from a low sand line. Inaccuracy was indicated also by periodic tests of the final refuse bank, which showed excessive losses of coal to refuse. Uneven appearance of the market product, which caused spasmodic condemnation, was further evidence of inaccuracy.

In the cone the desired specific gravity is maintained by agitating the sand with mechanical agitators and with water introduced at any one of four horizons, which, in order of their importance, are: (1) Classifier column water line, (2) bottom agitation spray line, (3) center agitation spray line, and (4) top agitation spray line.

Obviously, any increase in the volume of agitation water tends to decrease the specific gravity, and vice versa. Flow of agitating water is controlled by separate valves to each of the outlets. Though the operative soon learns how far each of the valves should be open to furnish the necessary water volume, he is not always positive whether the sprays are free of obstruction. Valve position, therefore, is no criterion of proper water inflow. Consequent variation in the specific gravities results in a spotted product and condemnation of cars which might have been passed without question if filled with a uniform product of the poorest fuel value loaded.

These conditions indicated the need for more positive control. To obtain this control it was assumed—to obtain samples of the final slate and place them in a solution having a specific gravity equivalent to that of operation—that the percentage of sink and float in the slate end would determine the gravity of the fluid mass in the cone; i.e., if 1.65 was being maintained in the cone, the test solution for the final slate should be 1.65. Numerous tests showed a margin of error in this method of between 0.5 and 1.5 per cent; that is, when the percentage of float in the final slate averaged 0.5 to 1.5, the gravity in the cone was 1.65. When the float increased above 1.5 per cent, the specific gravity in the cone was below 1.65; and if the float decreased below 0.5 per cent, the cone gravity was above 1.65. This formed a basis for operating the cones.

Final slate averages about 80 per cent chestnut, 6 per cent pea, and 15 per cent buckwheat with smaller sizes. Caps of coal that cling to refuse of egg and stove sizes are recovered by breaking in individual rolls and returned to the cones with mine-run feed. The egg size is broken to stove and smaller in one set, and the stove is broken to chestnut and smaller in the other. Experience has shown that when the float in the final slate goes above 1.5 per cent, there is undue degradation in these rolls. A typical loss from this cause would be:

Float at 1.65 Sp. Gr., Per Cent.

Final Slate	Egg Roll	Stove Roll
1.5	4.0	4.0
2.2	8.3	5.3
3.8	11.0	13.0

Calculations from these figures show that for a loss of 1.5 per cent in the final slate, the egg and stove sizes broken in the refuse rolls contain 4 per cent of recoverable material, and that when the loss in the final slate increases, the loss in the roll material also increases. Thereby the volume of material in recirculation is increased. Control of these factors is effected by hourly plant-control tests hereinafter discussed.

Final slate from each of four 15-ft. cones is sampled at 12-minute intervals and accumulated for each 1-hour period. These samples are tested individually to obtain the percentage of float in the slate end from each unit. A Delatester with zinc chloride solution is used for the purpose. This work is performed by the plant control tester, who immediately advises the four cone operatives of the results. Each operative enters the reported results in his record book on an 8-hour operating form, as in Table I.

It will be noted that, following the basis of regulation between 0.5 and 1.5 per cent, the float in the first operating hour was 2.1 per cent, which is above the allowable loss, and that in the second hour this was dropped to 1 per cent, by cutting down one turn on the valve to the center spray line. After holding this setting for two hours, the operative felt that the percentage of float was getting too low, and increased it slightly by adding one turn to the center spray valve. A further change was made, with the float remaining about the

From a paper presented at A.I.M.E. meeting in Pittsburgh, Pa., on Sept. 11.

Table I—Record of Cone Operation

Hour	Water Pressure Lb. Per Sq. In.	To Classifier Column	To Top Spray	To Center Spray	To Bottom Spray	Float Final Slate @ 1.65 Sp. Gr. Per Cent.	Remarks
		—Turns on Valve Admitting Water—					
7:00- 8:00	20	2½	0	3	3	2.1	
8:00- 9:00	20	2½	0	2	3	1.0	
9:00-10:00	20	2½	0	2	3	0.76	
10:00-11:00	20	2½	0	3	3	1.2	
11:00-12:00	19	2½	0	3	4	1.1	Sand added
12:30- 1:30	19	2½	0	3	4	2.8	
1:30- 2:30	19	2½	0	2½	3	0.81	
2:30- 3:30	19	2½	0	3	3	1.50	
Average						1.41	

same, in the fifth hour; but the operative misjudged slightly, as the float jumped to 2.8 per cent in the sixth hour. He then shut off 1½ turns of water and, as this brought the float too low, he added ½ turn. The average float was 1.41 per cent, which is about what we try to maintain. Our sales department is satisfied with the market product when the float is about 1.5 per cent.

Table I indicates that only the bottom and central spray lines are used. These give a more even distribution of agitation water than the top spray line. The classifier column is kept constant at an adjustment of only sufficient water to hold the sand in suspension and still allow the slate to drop freely through the column.

The cone operative keeps a record of all delays that cause a stoppage of the feed. This information, with plant control data, tell the operating officials at a glance the performance of each unit.

SPRAY blockage is indicated by hourly records kept by the coal operative. If the plant-control tests report 0.5 per cent float with the cone using a normal supply of water (as indicated by the setting of the valves in the report form), and further opening of the valves at intervals shows no increase in the float, the operative knows that the spray line is blocked. A unit operating in this manner gives an uneven preparation. If the sprays cannot be cleaned by blowing, the unit is emptied.

An ammeter at the cone operative's station, which is graduated in 1-point readings from 0 to 30, registers the load on the cone. Registration of 10 kw. indicates the proper time for trapping out the slate, the normal load being about 5 kw. At the operative's station also are installed ammeters to register the load on the 10-in. recirculating sand pump and on the 4-in. make-up sand pump. By this means the operative can tell whether the pumps are functioning properly, though they are located two floors below his station. When the reading on either of these ammeters falls below 15 kw., which is the full load on the pumps, a pump attendant is notified by klaxon.

With the performance of these units definitely known throughout the day, steps can be taken to remedy out-of-line condition immediately. But to apply this system of control properly other important conditions—speed regulation, sand loss, and silt removal—must be kept constant.

A Ross feeder was installed and operates successfully. It is simply a series of chains revolving across the width of the chute, which regulates the volume of coal to the shakers and to the cones, estimated to be about 200 tons per cone per hour.

Sand losses are noted from the cone operative's record book. If the day's operating report shows the use of more than a normal quantity of sand, the cause is sought and remedied immediately. A low sand line follows the loss of sand. Eventually an island is formed which stays the sinking of heavy slate, much of which then goes over with the coal.

Breaking of a driving arm or some other part on the shaker forces the domestic or desanding shakers to stop under load. If the 10-in. recirculating sand pump were allowed to run, an appreciable loss of sand would result. An emergency stop has been installed at the cone station to stop this pump when the shaker stops under load.

Plant-control tests of cone performance are checked against bank tests made by the inspection department. The bank tests consists of sampling the face of the slate bank and hand-picking to determine the percentage of coal and bone loss. Results of plant-control tests compare favorably with visual inspection.

Up until the time of this writing the cones at Marvine have cleaned 73,860 railroad cars of coal. Of these, 3,793 cars have been condemned, or 5.1 per cent. Operation of the cones was charged with condemnation of only 0.2 per cent of the total volume of coal cleaned.

LETTER

. . . to the Editor

The Marsh Fork Decision

Probably no tax decision of recent years has caused more comment and discussion among coal operators than that rendered by the U. S. Circuit Court of Appeals, Fourth District, in the case of the Marsh Fork Coal Co. In the July issue of *Coal Age* there appeared an article regarding this decision in which it was stated that the decision was most favorable to the coal industry in determining net taxable income.

While it may be conceded that the decision rendered by the Circuit Court of Appeals will result in a reduction of tax for the Marsh Fork Coal Co. for the year 1920, it is by no means certain that this decision, if adhered to, will prove an unmixed blessing to the coal industry. The fact should not be overlooked that the principle of law established in this decision may be applied by the Commissioner of Internal Revenue not only to income tax returns that are open but to those that are closed and upon which the period of limitation has expired for filing claims for refund.

That the principle of law as laid down in the decision may be a boomerang can best be illustrated by the following examples:

Example 1. Assume a mine to have been developed in the years 1907 and 1908, so that as of 1909 it was producing its normal output. The owner, subsequent to 1908, purchased such items as mine cars, mining machines, haulage locomotive, pumps, hoists, etc., and capitalized these on his books and took depreciation at a fixed annual rate. As of 1928 the annual depreciation on these items amounted to $20,000. In accordance with the Marsh Fork Coal Co. decision, the 1928 return should be audited by disallowing the $20,000 depreciation, on the grounds that the items upon which the depreciation is claimed were erroneously and illegally capitalized in former years.

Example 2. The conditions are the same as in Example 1, with the exception that the mining property was sold in the year 1928. Net income from sale of mining property was determined by the owner by deducting, from the sales price the depreciated cost as per books. The cost of the additions subsequent to 1908 less depreciation per books amounted to $250,000. The Commissioner may claim that the income from sale as reported should be increased by $250,000, and cite the Marsh Fork Coal Co. decision as the authority for doing so.

It is my opinion and the opinion of those who make a study of income tax matters that a taxpayer should think twice before claiming that, as a matter of law, mine cars, mining machines, haulage locomotives, pumps, hoists, etc., purchased after the mine is fully developed, should be charged to expense.

ERNEST L. BAILEY.

COAL AGE

SYDNEY A. HALE, *Editor*

NEW YORK, SEPTEMBER, 1930

Character control

WITH all the educational activity in the coal industry, little has ever been done to teach the personal side of management, which has to do with the handling of men rather than with the control of the forces of nature. Such matters include the reduction of costs, the economy of material, the development of system, and the creation of morale and a co-operative spirit. Perhaps only in Maryland and at the Carnegie Institute of Technology has attention been given to those more human elements in mine operation.

One cannot hope that these important features will come into the industry by any back door. The coal industry suffers from the fact that it has no contacts with other industries, for it lies so far afield from them all. A definite effort must be made to teach those principles and enunciate them. They have been discussed unmethodically and incidentally in the definitions of the duties of a mine foreman, but even then the safety side alone was usually emphasized, and not the human side, though with management that is systematic, consistent, disciplined, fair and orderly, safety will almost automatically result.

Training in the correct principles of management that will give the foreman the long view of all problems and cure him of some of his two frequent megalomania is something the industry greatly needs. To make such training vital and interesting and to prevent its deteriorating into mere drivel, presents many difficulties, but a course properly prepared and correctly presented should elicit a gratifying response from the entire organization.

Fit as a fiddle

ENGINEMEN on the railroad have always held it to be a principle of honor to find somehow a way in which to bring a defective locomotive into the roundhouse and, if possible, to complete a run. In the early days, the ingenuity that would permit of this had constantly to be exercised. Today the demand for such skill is much less frequent, for the locomotive is inspected regularly, and it is not allowed to travel on the road with any defective part that would be likely to give trouble. And as the cars go along the road they are inspected. No wonder train trouble is comparatively rare.

Unfortunately, such caution is not general in mines. Even in flameproof machinery, bolts may be missing or the assembly may be faulty, making it unsafe, as an electrical engineer a year or so ago found in making a tour of the western Pennsylvania mines. Cables are improperly spliced; motors are in bad condition. All of which does not pay, because a broken machine means places not cut, men laid off, a decline, or at least an unbalancing, of tonnage, and less coal available than the mine force could handle. Discontent of the men, breaking of schedules, burning of armatures, often destruction of equipment, and sometimes an explosion occur from the defect.

Equipment should be kept fit as a fiddle. The workmen should not find themselves unable to complete the full night's run. Successful management consists in the elimination of the unexpected. All that troubles the foreman engrosses his attention needlessly. When he is repairing one break in the chain of production, some other break goes unremedied. It is better for a repairman to make twelve trips to a machine in a schedule run without finding anything amiss than to make one trip that will keep him busy for some days or to have an accident that will put a man on compensation.

Wire saws for coal mining?

OLIVER BOWLES has shown, in a bulletin of the U. S. Bureau of Mines, how useful that Belgian invention the wire saw can be in the production of slate. A three-strand wire cable is oriented by pulleys from the driving unit to the place in the quarry where a cut is desired. Sand is fed to the cable with a small stream of water and is caught in the grooves of the cable and carried along with it. As it travels it comes in contact with the rock and wears away the rock particles. To get the wire down to the required level below the surface of the slate, two 36-in. holes are sunk with the aid of a light but large core drill, the core being shot loose from the bottom, after which it is an easy matter to sink a hole in it, secure an eyebolt in the hole, and hoist the core.

Doubtless, this plan could be profitably adopted in the channeling of coal in open cuts prior to loading it into cars. The vertical side of the berm would then be smooth and straight and the top undisturbed, so that tracklaying would be easy and the coal could be recovered up to the line where the spoil and coal meet. Some years back, W. E. Hamilton advocated and patented the use of the wire saw for cutting coal, declaring that it would then be possible to mine even the most friable mineral in blocks with a minimum of waste. In this case the wire was to be worked both horizontally and vertically, cutting the coal into blocks.

Such saws might be used to straighten up the ribs of coal, clay, slate, and sandstone in airways where large quantities of air have to be delivered

and to provide for such a regular increase in cross-section from shaft to splits, so that little loss would be sustained in the transition from velocity head to static head and so that also there would be minimum loss from rib resistance. That the wire saw has proved its value in the slate fields of Pennsylvania is evidenced by the fact that in a total value of product of $6,000,000 the annual saving has been $250,000. The possibilities of the wire saw for ditching, rib smoothing, and mining are worthy of thought.

What shall be done with ash?

OF PYRITE, iron constitutes 46.6 per cent, so that when all the pyritic sulphur is released the pyrite removed represents 1.875 times the quantity of sulphur. Consequently, quite a large percentage of impurity would be removed if we could by some oxidizing and leaching process remove all the pyrite. Experimental data are lacking, but it is conceivable that sometimes pyrite and the other non-inherent impurities in coal, such as alumina, silica, carbonate of iron, calcite, and gypsum, are closely intermingled, and the removal of one would loosen the others. Pyrite and calcite are found together in fusain; whether the two are so knit that the removal of one would by that act cause the other to drop out is a question. On the other hand, it is well established that calcite and gypsum are often found entirely unassociated with pyrite.

Whether the removal of the iron of pyrite or of carbonate of iron or even of calcite is a benefit metallurgically is doubtful. In Alabama and in France certain iron deposits so high in impurity as to seem to exclude them from metallurgical uses are extensively exploited because the impurities were found to be valuable as fluxes. The metallurgist may not object to all forms of impurity in coal, but the public utility does and always will object to lime. However, if the lime and sulphur were removed, the utility might overlook the other impurity, even though incombustible, provided it would not slag on the walls of his furnace.

At present all ash is ash, but the time may come when a distinction will be made and that which will appeal to the metallurgical chemist will not be that which will suit his fellow scientist who works for the public-utility corporation.

Compressed air finds new applications

DESPITE contrary impressions, the use of compressed air for driving machinery appears not to be a tale that is told. In the last year or so there have been several instances in which compressed air has once more been set to work, especially where flexibility and safety were paramount issues. It remains to be seen whether when newly installed in accord with the most modern practice, compressed air will succeed in winning back some of the ground it has lost during the last 25 years.

Compressed air drives many important mining tools in American mines. It has long been used to actuate drills in anthracite workings. In bituminous mines also the desire for safety has in some instances compelled its use for this operation. A large bituminous company is going so far as to install a number of stationary compressors underground for drilling purposes. Compressed air is being used to the exclusion of electricity for both cutting and drilling at the face of one comparatively large bituminous mine.

Its greatest appeal is for the operation of hammers and picks. In this, American operators are merely following the lead of the managers of the mines of Continental Europe. According to G. E. Vassart, in a paper recently presented before the Liége International Mining Congress, uses of compressed air are extending rapidly in Belgium and more and more powerful compressor plants are being installed. The lengths of pipe lines are being increased, and machines and tools operated mechanically are multiplying in number and in diversity of use.

Recent improvements in generation and transmission are partly responsible for the revival of interest in compressed air. In earlier days, large line losses were believed to be irremediable, but now even small leaks are looked upon as a reflection on the management. The per-unit cost of pneumatic power naturally is higher than that of electricity, and this for the most part restricts the field of application to face operations. It is claimed that some of this excess power cost is balanced by savings in the maintenance of equipment and that the rest also is balanced, or more than balanced, by the increase in safety—a betterment the value of which in gassy mines cannot be measured.

"Old-fashioned"

A FRIEND of the coal industry seeking a house in a suburban community of New York City this summer was insisting on automatic stoker equipment. "O, no," said the renting agent, "we don't want to do anything like that. Nobody wants coal now; coal is old-fashioned." If the real-estate interests are ignorant of the fact that the automatic domestic stoker is a comparatively new development, modernizing coal burning in the home, what can be expected of the average householder under a constant barrage of appeal from the gas and oil industries? There is a real selling job yet to be done right in the largest markets for coal. That job calls for intensive and persistent campaigning upon the part of everyone connected with the industry; it is too big a job "to let George do it" alone.

NOTES

. . . from Across the Sea

AT SOME of the European mines the management methods of Taylor and Gantt have been followed almost as closely as in the United States, where these methods originated. This, the Fourth International Scientific Management Congress, held in Paris, seemed to demonstrate. Articles were presented by two Polish engineers, one on time studies of the work of minor officials in the Kazimierz Colliery and one on the control of all mining operations. A third, by a Spaniard, recorded the success of a system of bonuses based on the entire output of a colliery with an account of the decline in production when, because of a rise in wages, the bonus system was discontinued. It is needless to say that these are not the only efforts made to establish scientific management in European mines but merely significant examples of what is being attempted. In Czechoslovakia scientific methods have been enthusiastically accepted and at least one of the mines has made careful studies. The Germans also have utilized the methods with characteristic thoroughness.

Marian Skup's article on the Kazimierz Colliery calls attention (1) to the lack of training of deputies in the work they were expected to do; (2) to a lack of control of operation, due to the aforementioned lack of training; (3) to the burdening of deputies with work they were not competent to do and which should have devolved on foremen; and (4) to the failure to designate the precise limitation as to the authority and work of the deputy. Mr. Skup emphasizes the fact that deputies are afraid to make a bad impression by confessing to inability to understand just what is expected of them. A chart shows the time planned for the performance of the deputy's several functions and the actual time expended on them. The second column in the chart refers to the book of rules and shows the chapter and paragraph in this instruction book where reference will be found to the specific duties named in the first column.

Dr. Fucholka, the other Polish engineer, described a control that related to production, labor, machinery, material, and finances, including production cost. The control of production applied to both quantity and quality. The desired quantities were designated by districts and working places. Available averages of past production per working face were taken for standards rather than information as to the full productive ability of a single working face. Crude as this was it resulted in showing the management where failures in co-ordination prevented normal production from being attained. Officials and workers have begun, says Dr. Fucholka, to think in terms of the standard.

Calorific value and sizing of the coal also were controlled, though Dr. Fucholka does not say that this control consisted in any more than in ascertaining how the coal must be handled in each section to obtain a given standard of purity and size. He does not say whether any means were taken to see in any section that the coal was continuing to be in accord with those standards, though a general control over the entire production was provided. A sectional check on coal quality and size would be extremely difficult to make. The standard working force made it possible to get a uniform mixture of coals, thus assuring the sales force and management that quality and size percentage would be close to standard.

In regard to labor, written reports proved too vague and too greatly based on the angle of the man writing them to be of any value to the management. They were soon discarded as worthless. The new report form, based on figures, gave more positive information and made the introduction of the Gantt graphical control feasible. Where the standard number was not reached it was required that the causes for the failure be specified by fixed numbers with the time in minutes.

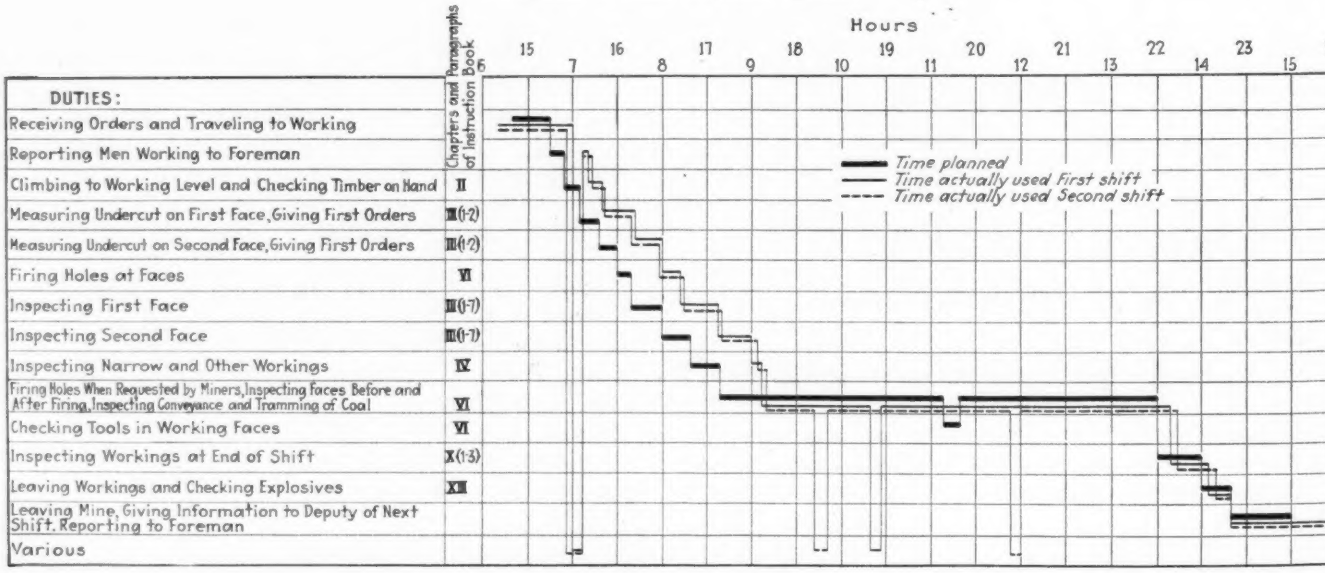
Among the standards established are: working force, timber set, timber on hand, cars loaded per working face, and explosive used. Other items reported are starting time for each section, finishing time, time recovering timber, and time engaged in wet stowing. In gangways the standards designate the distance to be driven monthly or weekly and the required width and height of these places.

The standards prescribe the number of timbermen, roadmen, and pipemen according to needs, the time when they shall work and what each shall do. Certain gangways, dams, pipe lines, etc., have to be inspected, and reports are made on the relation of these items to the standard and as to the material used in their repair.

The mechanic and the repair crew tour the mine on a definite course traveling on an agreed schedule of time. In consequence they are in a manner "visible to the management." Each machine has a control card specifying details as to load of motors, pressure in atmospheres, greasing, safety loads on ropes, spare parts needed, etc. Alongside is kept a daily record of the actual conditions. By this knowledge of the operating conditions which the reports give, it is possible to find the consumption of current at any time or for the day or month.

Of classes of material there were 3,300 items. It was found that the ordering, receiving, and consumption of material was handled in all by 50 officials.

Diagram of Mine Deputies' Duties



Experience showed that the setting up of standards by districts or persons was not sufficiently elastic, so each primary unit and its subordinate units were set up as a separate recording entity and allotted a control card with standards for the daily, weekly, and monthly consumption of material. The requisitioned items are written on the control card by the warehouse force, which, being controlled by the management, can slow up the delivery of material if, in the opinion of the latter, it is requisitioned with too lavish a hand. With all these checks, finance control becomes simple.

E. W. Blanco, the Spanish engineer, discussed at the congress in French an experiment made with a bonus system at the Cotomusel mine, in Asturias, in northern Spain. Here, owing to market difficulties, wages were reduced 10 per cent, but the miners were promised an increase of 10 per cent on the lowered wage if they would increase their production per man 20 per cent.

Every pay day a graph was posted showing the tonnage per man-day, the basal tonnage, and the tonnage that would, if obtained for a month, have earned the bonus. This was carefully explained by the management. The men at first took well to the idea. Tonnage increased eventually by 14 per cent. The management granted an increase of 5 per cent, retroactive for the three months in which good results had been obtained.

On certain days the men exceeded the 20 per cent excess production. It seemed that the full increment in output would be reached and the full bonus paid before long, but the union called a strike. Apparently business was good; a half peseta (9.6c.) a day was granted, and the bonus plan was abandoned. However, the tonnage held up well. The men again worked with enthusiasm, but the market dropped off, and big piles of unsold coal were stocked around the works. The men realized that the harder they worked, the more *chomage* or days of idleness they would have. So they brought the output down.

In the early days, when the base was set on the average tonnage for months of normal work, the output was 960 lb. per shift. The highest month by output —the one when the union made its successful demand—was 1,076 lb. per shift. After the market broke the output dropped to 859 lb. All of which seems to show the merit both of the bonus and the tonnage basis, though a combined tonnage and per-diem basis doubtless would be preferable. However, the output per shift is so small that conditions must be greatly different in Spain from those in the United States or there must be great inefficiencies or restrictions of output.

If any readers would like to get these papers, the *IV Congrés International de l'Organisation Scientifique de Travail* has published its proceedings. The price for the book is 125 fr. and for separate papers from 1 to 2 fr.

R Dawson Hall

On the ENGINEER'S BOOK SHELF

Hours of Work in Coal-Mines. International Labor Office, Geneva, 1930. World Peace Foundation, Boston, American agent. 108 pp. Price, 75 Cents.

In the present report, the International Labor Office, set up by the League of Nations, offers an analysis of the deliberations of the preparatory technical conference, recently held under its auspices as preliminary to the formulation of a program on hours of work for international agreement. The volume includes a survey of the considerations on which the draft convention is based, a proposal which provides that in all coal mines work shall be so organized that the time spent in the mine by any worker may not exceed 7½ hours per day or 45 hours in the week. Provision is made, however, for a transitional period of three years during which the time spent in the mine may be 7¾ hours a day and 46½ hours a week.

The term "time spent in the mine" is defined as the period between the time when the worker enters the cage in order to descend and the time when he leaves the cage after reascending. Collective methods of calculating the time spent in the mine are recognized exceptionally, on the understanding that they shall be abandoned as soon as possible. The convention provides further that annual reports from governments shall be submitted and examined by a special committee consisting of one government representative, one employers' representative and one workers' representative of each country ratifying the convention.

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"Mining Subsidence," by Henry Briggs, Hood Professor of Mining, University of Edinburgh. 215 pp.; 5⅝x8⅜ in.; cloth. Price, $5.50.

In this volume Henry Briggs has brought together much scattered information on subsidence in Great Britain, in this country, and in a smaller degree in other countries. The mass of material grows, light being shed on the subject from the excavation of all kinds of minerals with all manner of roofs and with a multitude of mining systems. In the main Professor Briggs has treated of coal.

In the opening pages he deals with the effect of subsidences on sewers, bridges, highways, tramways, water mains, reservoirs, and what not, and then he follows with terminology which is a feature in the discussion not always appreciated. It would be well if some of the terminology of stress and structure were added, for it is in the discussion of these that most misunderstandings arise. However, Professor Briggs has no ready-made theory of roof structures and stresses, so the need for a terminology does not make itself so severely felt as it would if the theory were elaborately expounded.

A summary of the theories of subsidence in the earlier days follows. These ideas have in general been repudiated in Great Britain, but they still have adherents in this country. Safeguards against subsidence and the effects of subsidence are described and noted. Those who do not believe in fracture over the pillar should wonder why so much care is taken to protect shafts and houses by generous pillars. If all the failure is intramural, why leave protection around such construction? Surely it is enough to leave a solid coal pillar under the improvements. Professor Briggs, however, adhering to the belief that there is breakage over the pillar even where there are no steep contours to cause slumps, is justified in treating of the effect of breaks over pillars on structures back of the excavated area.

British observations of mining subsidence follow with empiric calculations of draw in relation to dip. A number of the observations are tabulated. A digest is given of American, Indian, and Natal observations, the experience in general in these three countries—as presented—being concurrent. It is here said, "as presented," for evidence of another kind has been and is being collected in the United States and is ready for publication. The author does not seem to have much of this, though he has some of the earlier statements in favor of stress and breakage over the pillar. There is no reason to believe that the laws relating to the collapse of solids are any different here from what they are there.

Finally, Professor Briggs discusses the sagging of roofs and roof breaks within the mine with their vertical angles, or hade. Then shear is considered and the mechanism of mining subsidence. The reviewer is sorry that a bolder attempt to theorize was not made by the author, but most readers will be disposed to believe that he has gone as far as is safe and further than most writers on the subject. Yet roof is merely material in stress and the kinetics of such materials have been studied somewhat elaborately for a century, so perhaps the argument as to what has been noted might be fortified by a consideration of what must be, if strain follows stress and fracture follows strain. No Clerk Maxwell, McQuorn Rankine, or Cleypevron has arisen to calculate the stresses in mine roofs, but when he arrives the subject is likely to make great progress.

R. Dawson Hall.

THE BOSSES TALK IT OVER

Wage Payment—
By Day, Ton or Bonus?

"I'M worried, Jim," began Mac after he and the super got settled on their drive home. Those conveyors aren't doing nearly what I expected. Our conditions are good, yet—"

"It's the men," interrupted Jim. "They're not pushing the shovel. I guess they don't like the work. But they will have to get ambitious soon, or they won't have a job."

"Maybe it is the men, Jim, but why not call a spade a spade and out with the truth? It's wages, and we all know it. They don't like the flat day rate. They want a lump sum per ton to be split up into equal shares among the crew."

"A straight tonange rate," the super replied, "has never proved satisfactory and I'm not for it. If we could get somewhere with a bonus wage system of some kind, I'd say, all right."

"That's exactly what I have been thinking, but I'm not sure it will work," concluded Mac.

WHAT DO YOU THINK?

1. Which of the three wage payment systems do you favor, and why?

2. Is there a place for each of these systems, or is any of them fundamentally wrong?

3. Can a bonus system be applied to groups or crews?

4. Why should, or should not, bosses share the bonus?

All superintendents, foremen, electrical and mechanical men are urged to discuss the questions on page 544. Acceptable letters will be paid for ▸▸▸▸

Who should be held accountable for machine maintenance? Jim and Mac went to the mat on this question in August. How the readers of *Coal Age* would handle the problem is told in the letters following.

Let Adherence to Standards Fix Upkeep Responsibility

IT SHOULD be known as fact by this time that no mine can be operated successfully without the help of safety and maintenance standards. In the case of electrical equipment, the standards should provide for a periodic inspection of all equipment. These inspections should be daily for haulage motors, fans, hoisting ropes, and similar equipment. The operation also should have a set of rules and instructions for motormen, machine men, and pumpers.

Even with such standards in force, it would be only logical to have a man in charge of what may be called the maintenance department. It goes without saying that he should be a man of broad experience with electrical and mechanical equipment. His office should be held responsible by the management for the correct functioning and maintenance of all equipment, cost of the latter item to be computed on a per-ton basis. All electricians, wiremen, car repairmen, blacksmiths, and other mechanical men should come under his supervision.

At the outset it must be granted that the mine foreman be given full charge of his mine. Full responsibility for results in the face of divided authority would not lead to a happy ending Naturally, all available equipment should be at his disposal at any time for any place. But he should understand that it is up to him to see that operating standards are strictly adhered to by himself, his assistants, and all equipment operatives.

Under an arrangement of this sort, there would be a mine foreman and a chief electrician, of equal rank. The foreman would control all mining operations, which would include jurisdiction over all equipment operatives and over mine track. On the other hand, the chief electrician would have the say in guiding the work of all mechanics and men doing wire work and bonding inside the mine. This system should not prevent the foreman from giving what he thinks are necessary orders to any men inside or outside, regardless of whom the men may be working under, provided he can give good reasons for his orders if called upon to do so. In turn, the superintendent or general superintendent should hold both men responsible for their respective activities.

No question of authority is involved in giving equal rank to the foreman and chief electrician. Paradoxical as this may seem, the foreman would lose none of his authority. The arrangement would have a tendency to keep personal feeling out of the picture, as the foreman would know that, unless he complied with all maintenance standards, the electrician, as a last resort, could bring the matter before the management without jeopardizing his job. Granting that both men are of the right caliber, this functional rating would tend to bring the two men together on a common-sense basis, and cause them to realize that they cannot lose time in arguing if they are to accomplish the expected results. It would influence them to get together to work out the problems coming up from time to time, involving equipment. Their motto should be: "There's no limit to the good a man can do if he doesn't care who gets the credit."

The above plan should work satisfactorily for the smaller companies, provided capable electricians are employed. It is very much like the system employed on most railroads, where the master mechanic, road supervisor, and train dispatchers are responsible for the proper operation of their respective departments and do their work according to a uniform standard. One set of standards is in force all over the division, and all these men report to the division superintendent. In our case, the mine foreman would be a train dispatcher and road supervisor, the only exception being that the bonding would be under the electrician.

With larger coal companies, the same system could be followed, under the control of the general manager of operations. He should have a mine superintendent and a maintenance superintendent for each plant or division. In this case, the foreman would report to the mine superintendent, and the electricians or maintenance foremen to the maintenance superintendent.

One of the larger companies has been using this system and has proved that it is far superior to any other. But to be successful, personal elements cannot be allowed to creep in if the department heads are to handle their work so as to get the greatest tonnage at the lowest cost and in the safest way. The whole scheme is nothing but a common-sense proposition. It never did anyone any good to blame an electrician for high costs due to tonnage loss brought on by equipment breakdowns when the accused individual has been working day and night and Sundays to repair the equipment; when no attempt was made inside the mine to give this equipment a chance; and when the foreman tried to clear himself by telling the management that he could not get out coal with haulage motors and mining machines constantly broken down.

Van Lear, Ky. C. J. Fuetter.

Reprimand Careless Runner In Electrician's Presence

SHORTY should have all the support the foreman can possibly give him after his complaints and recommendations are carefully judged. This is the only way to get results. Should he report a man abusing a machine or motor, an investigation can be made and the work of the particular man observed for some time. If the seriousness of the offense warrants dismissal or reprimanding, it should be done in Shorty's presence.

The electrician should give orders to the runner of a machine or motor only so far as they pertain to the safe and economical operation of the unit. He ought to report directly to the foreman any abuse of equipment, for in most cases the foreman can get quickest results. If the superintendent wants a weekly or monthly report of equipment, Shorty should give a true report of the actual condition of equipment and whether he is getting all the assistance needed. Charles J. Lewis,

Ernest, Pa. Mine Foreman.

Let Records Tell the Story

HAVING experienced all the trials of Shorty, Mac, and Jim, I feel that I can discuss this question from the standpoint of each one. There is no fast rule which will apply to handling the chief electrician, as men and methods differ. However, I hold that if the chief is held responsible for the costs of his department, then he should be allowed to have the authority that is needed to control his job. If he told me that certain men were abusing machinery I would, after investigation, back him to the limit in any action he wished to take. He should be allowed to give orders to machine men when those orders have a direct bearing on the upkeep of the machine.

Whether the electrician should report to the foreman or the superintendent is an individual problem for each operation. In the case presented, however, Mac shows no degree of the co-operation necessary in an organization which functions efficiently. If he, as his talk would lead one to believe, thinks that

running a coal mine is a one-man job, he is not big enough for his position, and the sooner he is replaced the better.

We use a report which the electrician fills in when he repairs a machine. This report has the machine number, runner's name, date, time taken for repairs, and parts used. These reports are kept on file and are looked over by all the bosses. If a man is abusing a machine, the report shows it in black and white, and there is no argument. Also, this method gives every runner a square deal. He cannot be made the goat of someone's prejudice, for he also is informed of his rating, as a ratio between tonnage cut and repairs. This system keeps the machine men in line without a lot of bossing. THOMAS JAMES.
Vincennes, Ind.

Labor's Reward

There are two aspects to every question and sometimes a go-between angle. With the arrival of mechanical devices for loading and transporting coal in the working places, controversies as to correct bases of wage payments have ensued. Most operators think the flat day rate is most equitable. The minority believe in one of two alternatives: a straight tonnage rate or a task-plus-bonus plan. Those who think in terms of scientific management recommend the latter scheme. Here is much room for argument. What do you think? Send in your letters today.

Is Shorty a Capable Man? If So, Give Him Authority

INASMUCH as the chief electrician has full charge of all electrical and mechanical work inside the mine, he should receive the same consideration given to other officials. Not only should he have charge of the men on his maintenance crews but he should have under control the men who handle machinery underground. When he finds a man abusing a machine, he should correct him at once, and then report the matter to the mine foreman. The electrician should be the person to give orders to the runners, having first provided the mine foreman with evidence that he is qualified to instruct men in the handling of machinery. Faults with machines outside the mine and with the men who run them should be reported to the superintendent.
Manor, Pa. WILLIAM HAND.

All at Once—Nothing First

TO get results, Shorty should receive the support of his mine foreman. I feel for him in his daily ordeals. An electrician, especially at a mine that is highly mechanized, is depended upon to keep the operation going smoothly. He is, therefore, one of the most useful men in the mines today.

One of the troubles is that the average foreman has had no experience in electrical work and consequently does not know the real conditions with which his electrical friend must contend. Shorty has to listen to a good many complaints—motormen, pump men, hoist men, and other machine runners all bring their troubles to him. At the same time, he has two or more foremen to satisfy. Yet he has to listen and do his best to keep peace in the official family.

It should be realized that he cannot do everything at once. Dozens of problems develop simultaneously that need his attention. All he can do is to use his best judgment in doing the jobs in the order of their importance. No official is more watchful than the electrician in making his rounds of the various sections. Naturally, he sees the abuses of equipment which cause all the trouble. It is only natural that he should stop and explain to the machine operatives the harm they are doing, and what will be the results. Being human, he should not be expected to tell the foreman this and that about this one and that one. Anyway, the foreman has enough of his own troubles.

Certainly, the electrician should be responsible for the conditions that exist in his field of operation and of the equipment used therein. Knowing that the electrician is somebody, the machine runner will be more inclined to look up to him and to his advice. Much can be accomplished by having the mine foreman accompany the electrician in the latter's round to see what is going on. GORDON BOWEN,
Scranton, Pa. Mine Electrician.

Above All, Keep Good Will

HAVING spent 18 years as a maintenance man, I can certainly sympathize with Shorty, who has more troubles and less sympathy than any man at the mines. He never knows what he is going to do tomorrow or when he is going to get home to supper. Machines, motors, pumps, and hundreds of other things do not pick a convenient time to fall to pieces, as did the "One Horse Shay." I have seen many mysterious accidents happen, which, months later, were found to be due to ignorance or carelessness. I have seen breakdowns used as an excuse to get a rest and kill time. Some men do not seem to know what an oil can is for, nor to have any idea of the strength of a machine part.

It is my opinion that the electrician should take his orders from the superintendent, and not from the foreman. When the foreman has charge of the electrician he is apt to be overanxious to get the crippled equipment back in operation and cause the repairs to be improperly made. I once worked under a foreman whose slogan was "Fix it temporarily now, and fix it permanently some other time." As time went on I became covered with work and never got time to fix anything right.

Anything that is worth doing is worth doing well. If a man is capable of doing good work quickly, he should be allowed to fix things foolproof as he goes. A runner will take better care of equipment that is in good shape.

This is where the foreman and the electrician must pull together. When a machine is in good condition, it should be put in charge of the best man available. The electrician should then suggest to that man (not order him) how best to handle that machine. Show the man that you are going to do all you can to help him along; listen to his suggestions and his troubles. If a man will not respond to this treatment, then the mine foreman should see that he does the right thing or get someone who will. Above all things, strive to keep the good will of the crew.

Whenever possible, repair work should be done at a well-equipped shop. There, one man can do more work in one hour than he can do in ten in the mine. When he goes into the mine to make repairs, like the plumber, he generally has to make several trips outside to get material. The result is more trips outside while men and the mine wait. W. F. DEADERICK.
Wind Rock, Tenn.

When Rendering Decisions Always Give an Explanation

THE perplexing problem of who is responsible for this and that, and the ruffling of management feathers on the backs of the foreman and super over equipment abuse can be settled only by a clear out and out decision by the high one in command. The chief electrician, master mechanic, or any other department head should at the least be what his rank or title implies, and his duties and responsibilities outlined, not only to him but to those with whom he must come in contact. His associates must know the relationship and where their responsibility or functioning is joint and equal. Nothing in management should be left to assumption that can be defined beforehand by rules. The advice of a department head must be given consideration by those to whom it is given.

A good official in a position of authority, when he has occasion to speak to an employee in another's department on any matter in which both are mutually interested, ought always to remember to inform the other that he has done so. The tact of one's judgment can thus prevent any feeling of interference or meddling. Foremen are or should be future executive material. When prob-

lems of the kind discussed by Mac and Jim arise, the super is given a chance to teach the foremen a lesson in the art of management by rendering a just decision. Let it be so handed down that it will leave both men feeling friendly. This can easily be done by accompanying the decision with an explanation, which will be a great help in enforcing the ruling, much more so, I believe, than the brusque order to Mac given by the super in those words: "From now on you and your men will have to do so and so." CHAS. H. WILLEY.

Concord, N. H.

Exit the Mine Foreman; Enter the Electrical Chief

LET us shed a misty tear for the Macs of the future, for the raucous bellow that has resounded through the mine passages these many generations will soon become the mine manager's swan-song—if it be true that the dying swan breaks his lifelong silence and bursts into poignant, beautiful song. Changing times decree that the electrician's baton, rather than that of the mine manager, shall beat the time for the harmonious, three-time mine whistle symphony.

In the changed order, I see a near future when the mine manager will surrender his prerogatives, and will deign to receive orders from the electrical chief, even as the most humble of his votaries have done hitherto. From the mine bottom to the coal face and back, we are confronted by electrical units, intricate and varied. It seems to me that only a throw-back, suffused by veneration for generations of blundering custom, prevents us from kissing the mine manager a goodby. It's coming.

Inasmuch as every repair part must be requisitioned, and the use of these parts charged against the aggregate result of the machine's operation, surely it isn't too much to say that the chief electrician is very much concerned about the proficiency of its operator. It is becoming more and more apparent that the electrical chief should be freed from those strictures that continue to hedge him. He is, and should be, a law unto himself. The average mine manager has but one end in view—an ever increasing tonnage at the least possible man-unit cost. Note the distinction, please.

A call for more tonnage from headquarters and the requisite development may indicate placing additional loaders on a section. Being human and subject to temptation, the mine manager orders a four- or five-car addition to each trip hauled. Fine and dandy. The operating cost shows no increase so far as man-units are concerned, so the mine manager very generously sticks out his chest and pats himself modestly on both shoulders. A few burned-out armatures and the need of new tires and brake shoes at alarmingly short intervals means nothing in his young life. That's up to the electrical end, he says, with virtuous finality. And maybe the chief electrician doesn't mind!

The motorman may be efficient enough, but is pushed by greater and ever-increasing demands for results. He doesn't take time to change his trolley pole when backing up a short distance. The pole flies off the trolley wire and crashes into the roof above—a limp and useless appendage. A hurried rush for a new pole and the time wasted in the feverish changing of poles is too common to require elaboration here. Damn these slow shop men, anyway!

Now for a specific answer to the questions:

1. The chief electrician should be the final arbiter as to the qualifications of anyone in charge of an electrical unit. The operator should be hired by the mine manager with this distinct understanding.
2. Abuse of any machinery should be punishable by immediate dismissal of the offending party. Discipline can be maintained by only Spartan methods.
3. The operation of any electrical machinery should be dictated by the electrical chief or by a subordinate under his direction.
4. The chief electrician should be hired by the general manager, and held accountable to him alone, and not to the mine superintendent or mine manager, who usually are not technically qualified to supervise his activities.

Coal mines of the immediate future will be run by only two units, independent of each other. They will be accountable to the general manager. One will be the mine superintendent, who will lay out and supervise development and be responsible for tonnage. The other will be the chief electrician, who will place and man the machinery and be held responsible for its efficiency. Co-ordination of these two units will make for a smooth functioning operation, untrammeled by competitive units. ALEXANDER BENNETT.

Panama, Ill.

Shorty Should Instruct Men And Not Order Them About

HAVING been an assistant electrician for five years and an assistant mine foreman for eight years, I know exactly the feeling Shorty and Mac have toward each other. If Shorty sees that certain men are abusing the machines, he should take up the matter with Mac, and let him handle the situation. The only orders the electrician should issue to machine runners should be in the form of instructions as to the oiling, handling, and care of the machines. It should be remembered that the super has enough to take care of without having the electrician reporting on small details of mine operation. ALTGELD PROKES.

St. Clairsville, Ohio

Give the Chief Authority; You Give Him the Blame

MY EXPERIENCE of 18 years in and around the coal mines has proved to me beyond a doubt that the chief electrician should have authority to give orders to anyone operating equipment assigned to his care. As Mac is responsible for the output and for the bigger part of the mine cost, he has all he can properly look after. He should know that, and be glad to have the electrician take full charge of equipment upkeep.

In my opinion, the electrician should also be the master mechanic, unless the operation is an unusually large one. My experience has taught me that if the mine foreman has charge of electrical work, the electrician is inclined to be wasteful, chiefly because he is relieved from accounting for costs. If he is held responsible for the cost to repairs of equipment, he knows that if the tonnage falls off his costs will go up in direct proportion. Therefore, he will do all he can to keep the equipment in good repair and see that nothing is wasted.

Shorty should be on an even footing with the mine foreman, and take his orders direct from the superintendent. What is more, he should have the authority to discharge any employee who is caught abusing equipment; but he should not exercise his authority except when it is absolutely necessary for him to do so. If the runners of the equipment know that he has that authority, he will have little trouble getting them to take care of the machines under their supervision. J. A. RAY,

Roanoke, Va. *Chief Electrician.*

Publications Received

The Lower Limits of Inflammability of Natural Gas-Air Mixtures in a Large Gallery, by J. E. Crawshaw. Bureau of Mines, Washington, D. C. R. I. 3,016; 13 pp., illustrated. Results of series of tests to determine the effect of different sources of ignition and the effect of turbulence produced by a two-speed electric can using an electric igniter as the source of ignition.

Mine Atmospheres, by W. Payman and I. C. F. Statham. Pp. 327, illustrated; price, 10s. 6d. Methuen & Co., Ltd., London, England. The book is divided into two parts, dealing with the physical and chemical properties of mine atmospheres, and the detection, estimation, and analysis of mine gases and dusts.

Mineral Resources of the United States, 1927. Bureau of Mines, Washington, D. C. Part I, Metals, 782 pp.; Part II, Nonmetals, 687 pp. The price of the former is $1.25, and the latter $1, bound.

Systematic Timbering Rules at the Washington Coal Mines, by S. H. Ash. Bureau of Mines, Washington, D. C. I. C. 6,316; 8 pp.

Eighth Annual Report of the Safety in Mines Research Board, including a report of matters dealt with by the Health Advisory Committee, 1929. H. M. Stationery Office, Adastral House, Kingsway, W.C.2, London, England. Pp. 64. Price, 1s. net.

OPERATING IDEAS

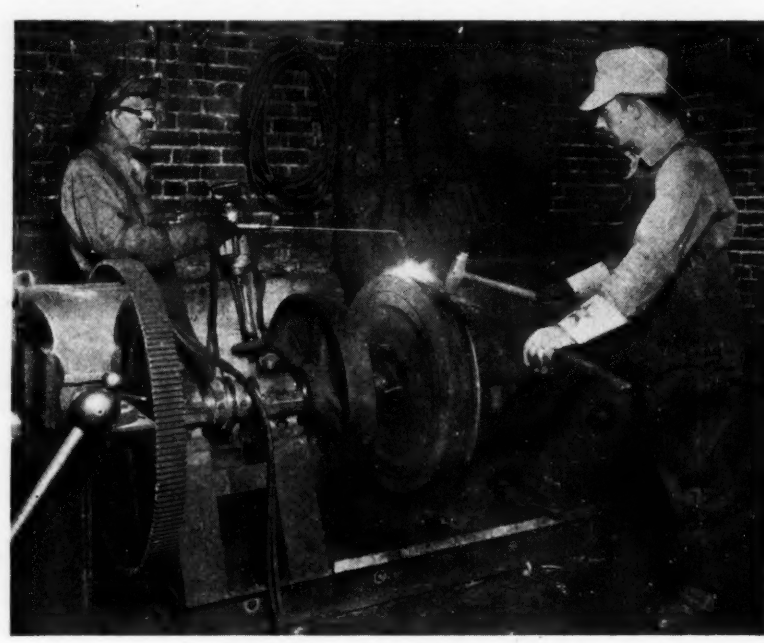
From PRODUCTION, ELECTRICAL And MECHANICAL MEN

High-Carbon Strips Give Satisfaction As Welded Tire-Tread Fillers

MANY COMPANIES have tried and given up the filling of worn locomotive tires with electric weld; a few are continuing the practice after several years of experience with it; still others have gone back to the practice after abandoning it for some time. For about 18 months the Davis Coal & Coke Co., Thomas, W. Va., has been filling tires with the electric welder and reports an attractive saving. Many of the first tires to be filled have again worn to the limit and have been through the shop for the second filling. The comparatively good service delivered by these tires, and the success in the second filling, indicates that the direct money saving is not counterbalanced to any extent by loss from delays or shorter service.

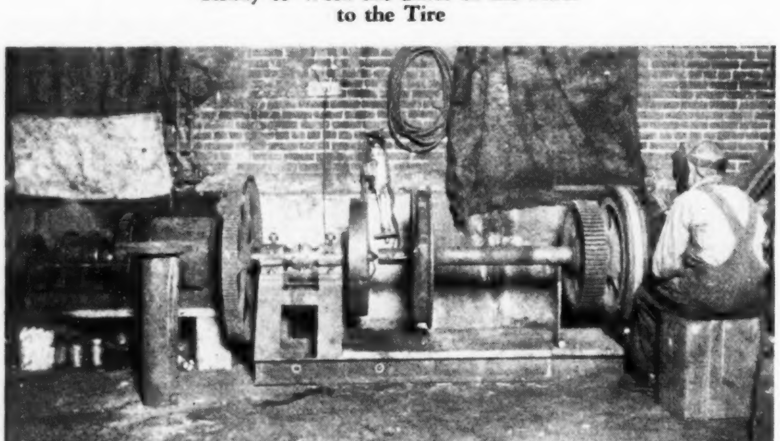
Because of excessive grades, necessitating generous use of sand, the tires are worn rapidly. On all tires worn to the extent that the tread filling will be $\frac{1}{2}$ in. or more thick, flat filler strips of high-carbon steel are used, they being bent to fit circumferentially in the tread groove and electrically welded in place. On tires where the filling is to be less than $\frac{1}{2}$ in. the entire fill is made by depositing electrode metal.

Filler strips $1\frac{1}{2}$ in. wide and $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ in. thick are kept in stock. In applying them, one end is tacked to the tread with the welder; then, as the tire



As the Tire Is Turned Slowly the Strip Is Heated and Hammered Into Place

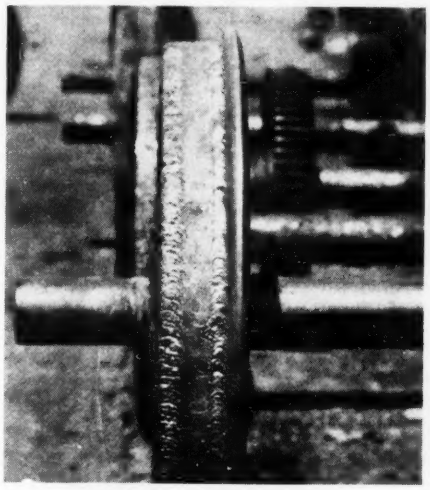
Ready to Weld the Sides of the Filler to the Tire



is rotated slowly, the filler is heated progressively with an acetylene torch and hammered down into the groove to a snug fit on the curvature. The other end is tacked with the welder before the strip has cooled completely, thus taking advantage of shrinkage to get a tight fit. The band is not necessarily in one piece, but may contain a short length between ends of the longer piece. In this case the short piece will have both ends welded in the same way as the long piece.

In the final process the filler strip is electric welded to the tire by running a bead along each side. The tires are put into service without machining or grinding the tread.

It is interesting to note what becomes of the filler when the tire is worn and



Finished Tire With Filler of High-Carbon Steel

the filler becomes thin. It is welded so securely that it stays in place until almost completely worn away. In some instances short thin pieces have come out but in so doing have caused no difficulty. Ordinarily, however, the truck is removed from service before the filler is worn through at any point.

The practice, of course, involves the problem of removing the remainder of the filler strip before a new one is applied. This is done by heating the end with a gas torch to cause sufficient warping that a heavy chisel can be started under it. It is then easy to tear the worn filler loose by driving the chisel under it along the circumference.

Since the start of this practice over 100 sets have been filled. For a recent month the total cost for material, labor and electric power was $8.21 per tire. New tires of the size would cost $24 to $25 each. Whereas a new tire delivers two wears, it has the shop expense of the first application and of the turning between wears.

Tire filling is done without removing the tires from the truck and no annealing is done after the welding. Welding is carried on in a special lathe made from scrap parts. This lathe is driven by a 3-hp. 1,800-r.p.m. motor that was on hand. The gear reduction gives a peripheral speed of 18¾ in. per minute on a 30-in. tire. Other parts, such as worn shafts, are welded in the same lathe, and the filling is done by applying the bead in a progressive spiral around the shaft. At the time the photographs were made plans were being formulated to try an automatic welding head on the work.

Progress

It was only after a free exchange of thought and information was established through the printed word and other agencies that civilization strode ahead to attainments of the modern day. By wide dissemination of existing knowledge, duplication of common achievements was eliminated and unsolved problems sharply outlined. What is true of the broad social field also is true of industry. In the field of mining, tested ideas are considered an important phase of operation. Exchange of these ideas is the purpose of these pages. Coal Age gladly accepts the responsibility of carrying on the exchange with your continued support. Contribute your new ideas and you contribute to progress. Accepted ideas, clearly if only roughly illustrated, are paid for at the minimum rate of $5 each.

Skid Between Wheel and Rail Holds Trip Steady

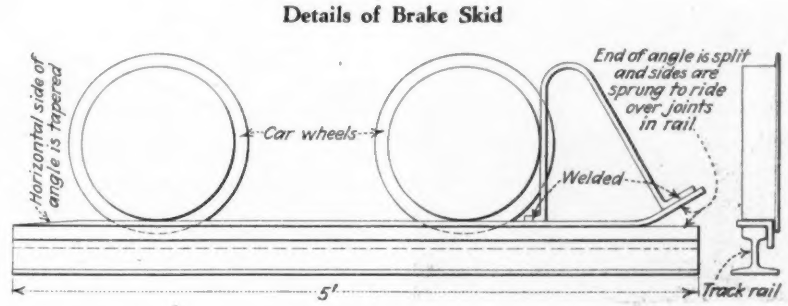
Where grades are heavy, acceleration in the speed of trips generally is checked by holding the wheels of some of the cars with either brakes or sprags. These schemes are not always satisfactory, because resistance to travel is offered by only the small area between wheel tread and rail. Locked wheels cause flat spots on the tread.

A substitute method is suggested by S. J. Hall, Stickney, W. Va. It is a skid shoe which rides on the track rail between the rail and two wheels on one side of a mine car. The shoe is made of 3x2-in. angle iron, ½ in. thick and 5 ft. long. This angle is so applied to the rail that the 3-in. side rides on the rail while the 2-in. side projects downward on the inside, as the accompanying sketch indicates. The flange of the mine-car wheels holds the shoe on the rail.

At the rear end the angle iron is tapered to allow the wheels to be pulled onto it. At the front end the angle iron is split and sprung outward, the flares allowing the shoe to ride over rail joints. A bumper bar, of 2x½-in. iron, welded or riveted to the shoe, serves as a bumper which is engaged by the front wheel.

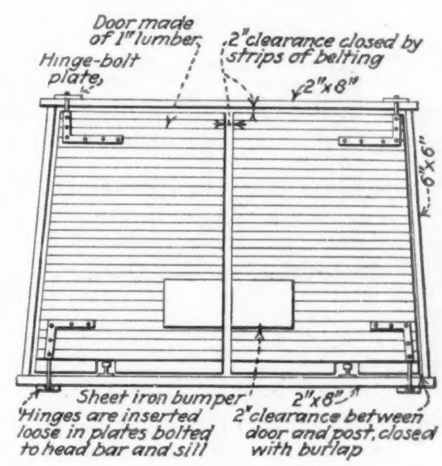
Two to four of these shoes are sufficient to hold the average trip on grades as great as 8 to 9 per cent. The first is placed on one side of the second car from the front end and others are spaced at intervals in the trip, they being staggered. It is said that these retarding shoes steady the trip by keeping out the coupling slack between cars.

Details of Brake Skid



Free-Swinging Double Door For Mine Use

Curtains for turning air appear to be so much of a makeshift that one wonders why they have not been displaced by a more substantial barrier. Walter Hornsby, Glo., Ky., offers a substitute in a free-swinging double door which can be used also in place of the ordinary single door underground. In the latter service, however, it is restricted to entries having an air velocity of 300 ft. or less, because it opens two ways. A higher velocity would hold the door open.



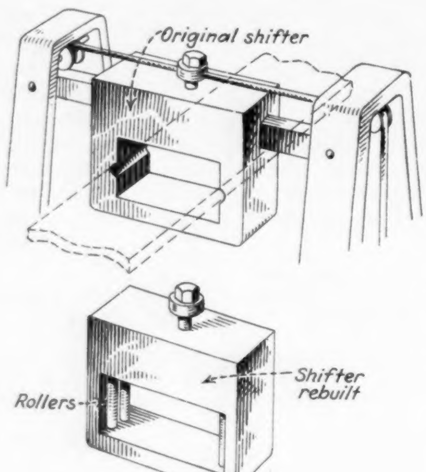
It Opens Either Way

Details of this door are given in the accompanying sketch. It closes automatically of its own weight, as do all gravity doors, and is supported between vertically disposed hinges. Between the doors is left a clearance of about 2 in. which is closed by the overlapping of two pieces of belting. One piece is

nailed to each door. Twenty of these doors are installed in the Glo (Ky.) mine of the Glogora Coal Co.

Rollers on Belt Shifter Stops Wear

Solid-bodied belt shifters cause a belt to curl and its edges to become frayed. This trouble can be remedied, according to Charles W. Willey, of Concord, N. H., by changing the design of the old-time shifter to conform with that illustrated by the accompanying sketch. The change is simply effected



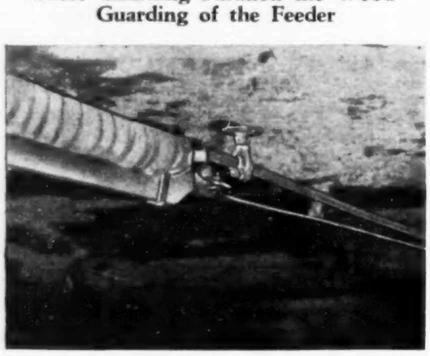
Modernizing an Old Device

by relieving the sides of the belt slot in the shifter and installing two pairs of rollers. He claims that any forked shifter will perform better and that belts will be saved by this arrangement.

Split Rock-Dust Hose Guards Feeders at Crossings

Feeders as well as trolley wires should be guarded at points where men must cross under them and, as it is practicable to cover the feeder completely, that should be done. The accompanying photograph shows a type of feeder guarding used in Federal No. 1 mine of the New England Fuel & Transportation Co., Grant Town, W. Va. This is made of hose no longer suitable for rock dusting. It is split and held around the feeder by friction tape.

Hose Guarding Parallels the Wood Guarding of the Feeder



Unless the mine is dripping wet this guarding provides a protection next in efficiency to some type of waterproof insulation.

Doors Prevent Air Reversal If Motor Fan Stops

Automatic check doors in the airway to an exhaust fan, and automatic communication of the starting and operating condition of the motor, to a watchman, are features of the ventilation equipment at Yukon (W. Va.) mine of the Yukon Pocahontas Coal Co.

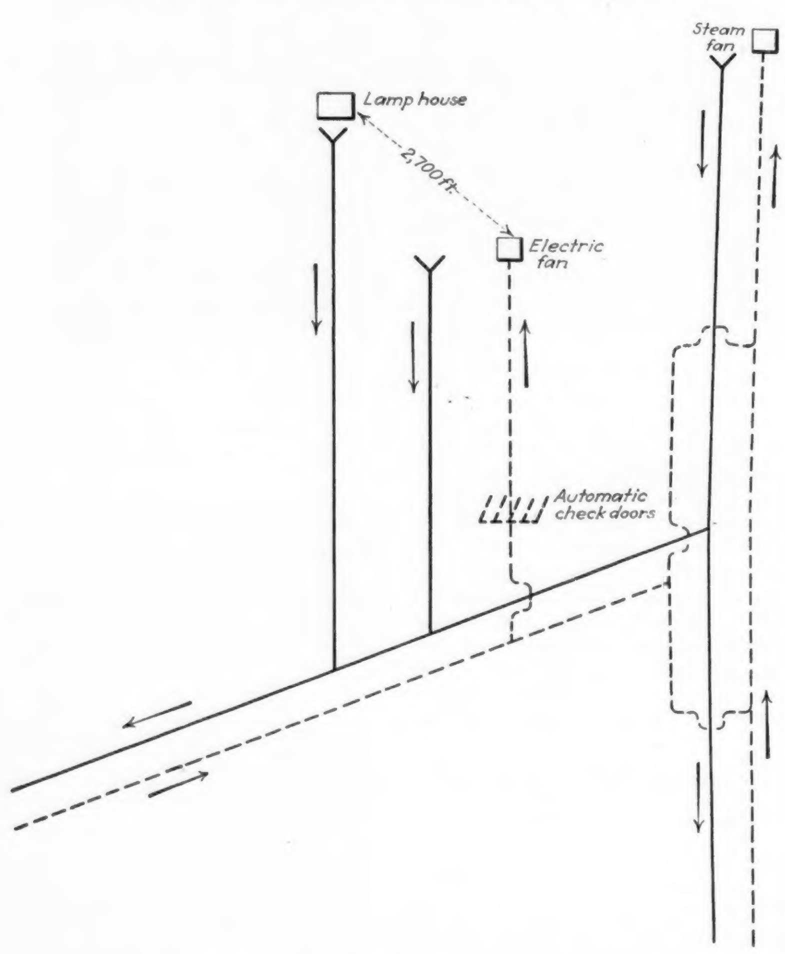
Two exhaust fans, one driven by steam and the other by purchased electric power, operate in parallel. On the accompanying sketch of the main airways, the intakes are indicated by full lines and the returns by broken lines. To prevent a short-circuit of the air by a reversal of direction through the electric fan in case of a power failure while the steam fan continues in operation, the airway to the electric fan is equipped with a check valve. This valve consists of a breast of overlapping doors pivoted so that they close automatically if the electric fan stops.

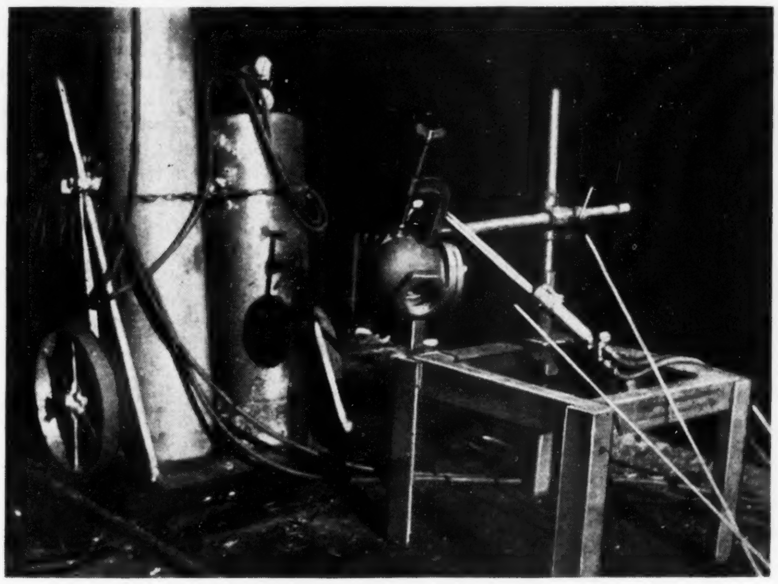
This fan, which is located 2,700 ft. from the lamp house, where a watchman always is on duty, is equipped with an automatic starter. In case this fan stops, an alarm sounds in the lamp house. If the trouble is due to a mainline power failure, which will be indicated by the lamp-house lights going out, the watchman need only listen on a telephone receiver to learn if the motor starts properly when service is restored. This is communicated from a telephone transmitter mounted near the motor.

This Portable Welding Bench Speeds Repairs

Welding has become so important a factor in the repair of equipment that every step should be taken to expedite and add to the convenience of the job. An aid to welding of small jobs is a portable open-top bench, made of angle irons, which is provided with a work vise of the clamp type. This vise can be revolved through 360 deg. both ver-

Operating Steam and Electric Exhaust Fans in Parallel





When Gripped in the Vise the Work Can Be Turned or Swung

tically and horizontally, a feature which is greatly appreciated on jobs of odd-shaped pieces.

The open top is intended for the cutting of large objects, allowing free passage of the welding flame and sparks through and below the metal. When the bench is to be used as a table for welding small pieces, the open top can be covered with sheet iron. Many uses will be found for this bench, according to C. D. Burdette, who designed it for use at the mine of the Dunedin Coal Co., Concho, W. Va.

Semi-Automatic Man Hoist for Slopes Controlled From Car

IN THE State of Washington, where measures pitch steeply, hoisting slopes usually are driven wide enough to accommodate two tracks and trips are handled in balance at high speeds by first motion electric hoists. Mining laws in this State provide that special cars be provided for men on slopes of 20 deg. or more, and that no man can be hoisted simultaneously with a loaded car. While the laws do not specify that a man cannot be hoisted along with an empty trip, such practice would be quite dangerous and also would tend to delay coal transportation. For the reasons set forth, it is desirable to provide separate hoisting shafts or slopes and hoisting equipment for the transportation of men and materials as is sometimes the practice at the larger mines.

A step farther ahead of these provisions has been taken at the No. 5 mine of the Northwestern Improvement Co., at Roslyn, Wash. The feature of this hoist is that no hoistman is required for its operation, the control being constantly under the control of the men riding the trip. Details of its design are provided in Information Circular 6,301 of the United States Bureau of Mines, prepared by F. H. Ash and E. M. Brooks.

This hoist and accessory equipment are housed in a concrete building about 200 ft. back from and in direct line with one of the main airways. It operates a car which has a seating capacity for six men and travels on a slope which is 1,200 ft. long on a 38-deg. pitch. The hoist is driven through a worm gear by a 500-volt shunt-wound d.c. motor at a car speed of 120 ft. per minute. It is provided with a gravity friction brake with magnetic release, which is mounted on the motor shaft and is wired in multiple with the motor field coils. The hoist also is equipped with emergency friction brakes which operate by gravity. In case of overspeed they are released by a governor geared to the drum shaft. When they set, these brakes open the control circuit at contacts 2E-2C (see Fig. 1) and the motor stops.

In the event the car should meet an obstruction and be stopped, the hoist would continue to run and unwind the rope unless some provision was made to stop it in this emergency. A weighted sheave wheel which rides the rope about 4 ft. from the drum, acts in this emergency. If the rope becomes slack, the sheave drops downward and opens the contact 2C-2B and stops the hoist. Limit switches S1 and S2 are mounted on the hoist indicator, which is connected to the drum shaft through sockets and chain. The position of the hoist at all times is indicated by the pointer P.

Control wires are located in the return air. For this reason it was necessary to use a low potential in order to comply with the mining laws. As shown in Fig. 1, a bank of lamps connected in parallel gives the desired potential across the control wires, which is 24 volts. Control wires L1, L2 and L3 are No. 8 semi-hard drawn copper supported from the roof over the center of the track and spaced about 3 in. apart. At the top and bottom landings are located pilot lamps, which, whenever lighted, show that power is available and that the control wires are in a safe condition.

When the hoist is in operation and traveling downward, the lamp across L1-L2 remains out and when the hoist is traveling upward, the lamp across L2-L3 remains out. These lamps are of the automobile type, 2 cp. 18-volts, and are connected in series with a small resistance. The latter is high enough that the relays are not affected, and reduces the pressure across the lamps below normal, thus giving the lamps a longer life.

Relays A and B are energized by connecting L3 and L2, or L1 and L2 respectively. This is done from the car by touching the pairs of wires with a short hand-held insulated conductor.

If an employee desiring to go outside finds, on reaching the bottom landing, that the car is not there and that the pilot light L2-L3 is lighted and the other lamp is out, he knows that the hoist is moving upward. Consequently, he will wait until both lamps are lighted, which informs him that the car has reached the top landing. He bells the trip down by shorting wires L1-L2, which will bring the car down and stop it automatically at the landing. He climbs into the car, and reaching up, shorts the lines L2-L3, thus energizing line 23 and operating relay A.

Closing of the contacts on this relay energizes line 5 and, in turn, line 5A through the interlocking relay contact operated by contactors D and D1. Line 5A energizes line 5B through the limited contacts 5A-5B on the indicator, closing contactors U and U1. In the next step line 30A is energized from the 500-volt control wire 2 through the relay E, which closes relay F. Line 2E is energized through the contacts 2-2A to 2A-2B to 2B-2C to 2C-2E, and energizes 2F. Contactors U and U1 are now held closed through the resistance in 2F-2H.

Line 2K also is energized by the contact of relay F, which energizes the contact-making arm of H. The latter rises slowly and starts the hoist by closing contactors M, K1, K2, and K3. When this arm begins to move, it opens contact 20-20A and de-energizes line 20A, so that relays A and B cannot

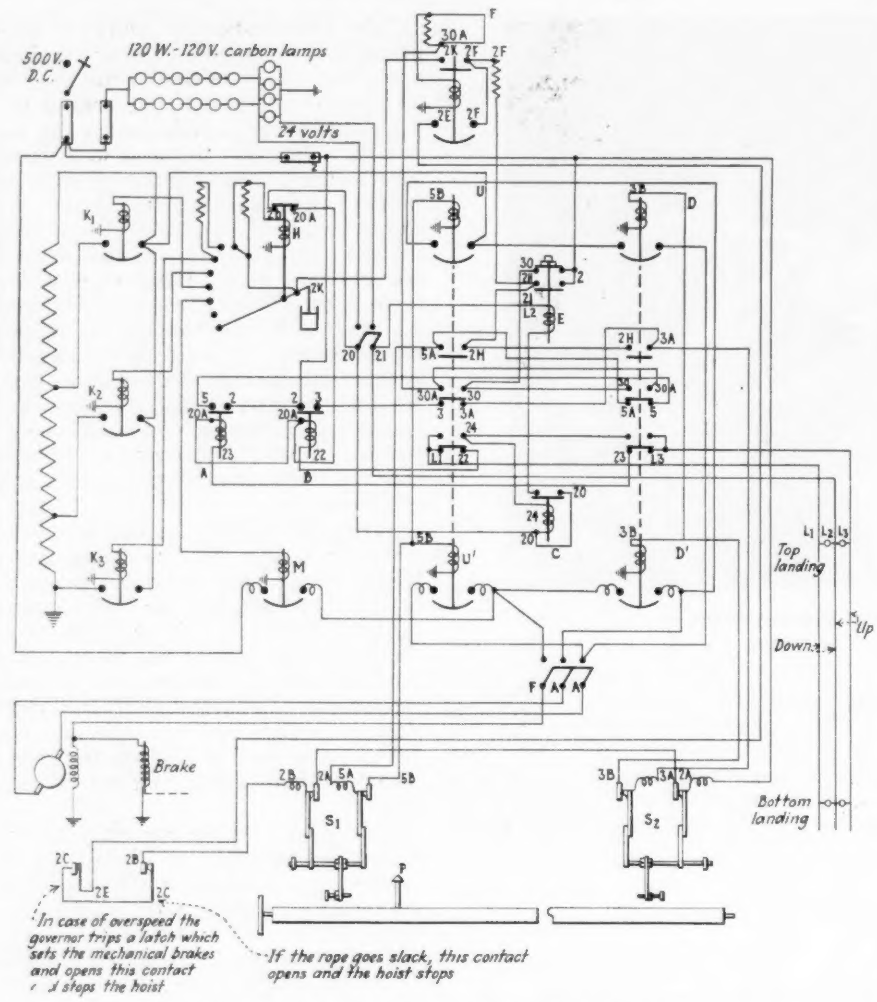


Fig. 1—Wiring Diagram of Hoist Circuit

operate. The control is transferred to relay C, which is connected to L1 through line 24.

The car stops automatically at the top landing and the pointer P operates contacts 5A-5B. Should the rider desire to stop enroute from top to bottom he shorts lines L1-L2 to operate the relay C. Relay E then functions and the hoist stops. The top landing is the limit of the upward traveling of the car. However, the latter can be belled down.

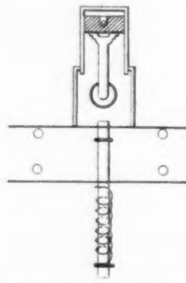


Fig. 2—Relay E With Time Delay

After it has traveled a few feet the contact 5A-5B is restored. Should the car for any reason travel past the landing, emergency contacts 2-2A or 2A-2B will open and cut off the control circuits. In this case the hoist is placed out of service and cannot be made to operate until an attendant restores the contact by operating the hoist from the control board.

Details of relay E are indicated in Fig. 2. When the hoist is stopped between landings by the operation of this relay, the lower contacts are closed before the uppers are opened. The hoist does not stop when the relay is energized; the contactors are held in by the circuits across 2-2H. But the moment the hand-held circuit-closing conductor is removed the relay is de-energized and the hoist stopped. It cannot be operated again until the upper contacts are closed. These are provided with a time delay. It is necessary to stop the hoist by a delay because if the hand-held conductor were left on the control wires for more than an instant the hoist would stop and immediately start again in the reverse direction.

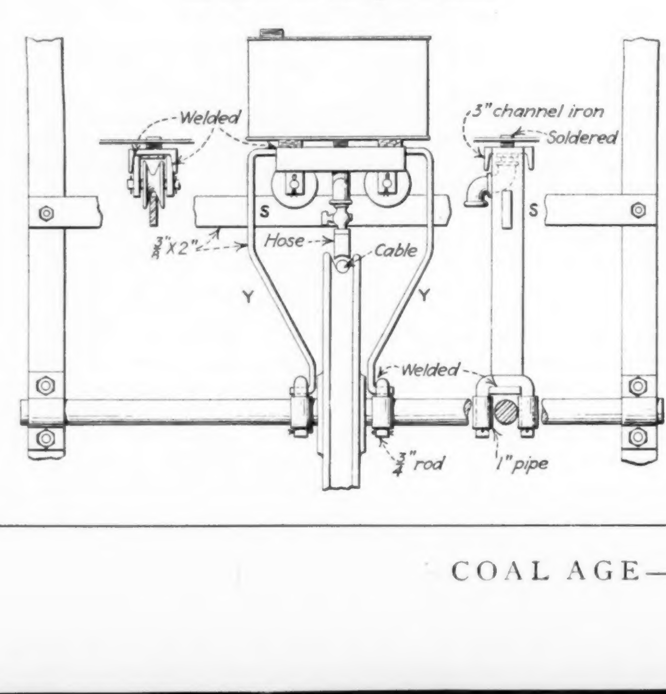
Automatic Slope-Hoist Cable Oiler

A device designed for oiling slope-hoist cables in mine service is described by Axel Lekstrom, of Ironton, Minn., in the Aug. 19 issue of *Power*. This cable oiler, which was made from odds and ends found around the mine shop, provides a method of lubricating a rope which is said to be more advantageous than the usual method of applying cable grease, both in the saving of time and material. It calls for the use of a lubricant of the fluidity of black oil.

Located on the first pulley stand from the engine house, where the "whip" in the cable is a minimum, the oiler rides on a rail of $2\frac{3}{8}$-in. flat iron and follows the sheave. The carriage, improvised from discarded trolley wheels, is held in line with the sheave shaft by the yoke Y which is slotted at S and pronged at its lower ends. These prongs fit over the sheave shaft, the arms being fitted with rollers of 1-in. pipe which prevent scraping of the shaft.

Welded to the carriage is an oil reservoir tank (a discarded oil can) from which oil is led by a pet-cock fitted with a nipple on one end and a piece of hose on the other. Adjustment of the feed is made according to the length of the cable and the frequency of operation.

Details of Traveling Lubricator



AMONG THE MANUFACTURERS

R. C. Kennan has been made manager of the service department, Brown Instrument Co., Philadelphia, Pa., vice George W. W. Corman, treasurer of the company and manager of the service department, retired. E. T. Nahill has been made field supervisor under Mr. Kennan.

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Robins Conveying Belt Co., New York City, has been granted by the Adams Coal Machinery Co., Plainfield, N. J., the right to manufacture and sell the Adams avalanche, withdrawal, and floating chutes.

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Cutler-Hammer, Inc., Milwaukee, Wis., has acquired Schweitzer & Conrad, Inc., Chicago, manufacturers of high-voltage electrical equipment. The latter company will continue to operate as an independent manufacturing and selling unit. Beverly L. Worden, president of Cutler-Hammer, has been elected president of the acquired company, while Mr. Schweitzer and Mr. Conrad have been retained as consulting engineers. On July 1, the "Reynolite" division of the Reynolds Spring Co., Jackson, Mich., manufacturer of Bakelite flush plugs, plural plugs, etc., also was taken over by Cutler-Hammer.

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James S. Fenton, of the Reliance Electric & Engineering Co., Cleveland, Ohio, has been promoted to sales engineer, with headquarters at the New York City office. The Boston (Mass.) office of the company has been removed to 89 Broad St.

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William Piez has been made European correspondent for the Link-Belt Co., Chicago, with headquarters at the Hotel Lutetia, 43 Boulevard Raspail, Paris (6E), France. The Pacific division of the company has moved into its new manufacturing plant and offices at Paul Avenue and Bayshore Highway, San Francisco, Calif., which will serve both as a service station and manufacturing plant for elevating, conveying, and power-transmission machinery.

Ohio Brass Co., Mansfield, Ohio, has removed its Dallas (Texas) office to 1010 Allen Building.

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Burton Explosives, Inc., Cleveland, Ohio, hitherto a sales organization, has gone into the explosives and chemical manufacturing field with the purchase of a plant site covering 418 acres near New Castle, Pa. A plant to employ 100 men is now under construction and production of explosives is expected to start Jan. 1, 1931, to be followed by the development of line of heavy chemicals.

E. D. Bullard Co., San Francisco, Calif., has established a branch office at 224-230 Huron St., Chicago, in charge of C. M. Glidden.

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Neil Otey, formerly of the Baltimore (Md.) office, has been appointed district manager for the Poole Engineering & Machine Co., with headquarters in the Union Trust Building, Pittsburgh, Pa.

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E. C. Wilson, formerly in charge of the pricing group of the gear and reducer division, Foote Bros. Gear & Machine Co., Chicago, has been made assistant sales manager. Mr. Wilson was until 1929 assistant sales manager, R. D. Nuttall Co., Pittsburgh, Pa.

A. F. Murphy has been appointed works manager of the Zanesville (Ohio) division of the American Rolling Mill Co., Middletown, Ohio. The Zanesville division, formerly a part of the Middletown (Ohio) division, will be operated as separate unit. Mr. Murphy was first employed as laborer in the Zanesville plant and, after working at numerous other positions, was made plant manager in 1922. L. F. Reinartz, assistant general superintendent since 1923, has been made works manager of the Middletown division. Mr. Reinartz joined the company in 1909 as chemist in the open-hearth department. G. D. Tranter, open-hearth superintendent, has been appointed to the newly created position of general superintendent of the Middletown division, and S. E. Graeff has been made assistant general superintendent. Mr. Tranter joined the organization in 1911 as weighmaster in the open-hearth department.

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Wood Preserving Corporation, Pittsburgh, Pa., has been formed by the amalgamation of the Ayer & Lord Tie Co., Chicago, and the Century Wood Preserving Co., Pittsburgh. The two companies will continue under their present names and management.

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Lorin W. Smith, Jr., of the Minneapolis Honeywell Regulator Co., Minneapolis, Minn., has been appointed sales promotion manager by Combustioneer, Inc., and will have his headquarters at Goshen, Ind.

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Federated Metals Corporation has removed its offices to 295 Madison Ave., New York City.

Trade Literature

Fully Enclosed Fan-Cooled Induction Motors, Type AA, Form F, With Ball Bearings, for Two and Three-Phase Alternating-Current Circuits. Reliance Electric & Engineering Co., Cleveland, Ohio. Bulletin No. 107; 8 pp., illustrated.

Arktite Extension Cable Connectors. Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2215; folder giving price lists which supersede those given in Condulet catalog 2200.

Evaporators. Griscom-Russell Co., New York City. Bulletin 361; 35 pp., illustrated. Discusses the functions, applications, and advantages of evaporators for distilling boiler-feed make-up water.

Demolition Tools and Sheeting Driver. Chicago Pneumatic Tool Co., New York City. Bulletin 865; 11 pp., illustrated. Besides the demolition tools and sheeting driver covered in this bulletin, specifications of accessory equipment, including tamper shanks and digging tools, are covered. Rock drills are also included.

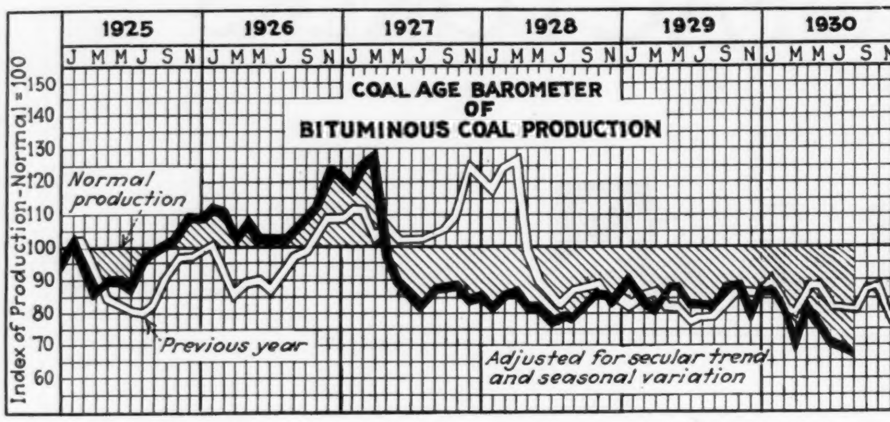
Locomotives—"Why You Can Haul at Least 30 Per Cent More Per Ton of Locomotive With the Modern Heisler" is the title of a 32-pp. illustrated book issued by the Heisler Locomotive Works, Erie, Pa. Numerous photos of hauling operations are shown and reports from coal strippers are given. Proper track ratings, computation of required power for given loads, data for measurement of curves and grades are also included.

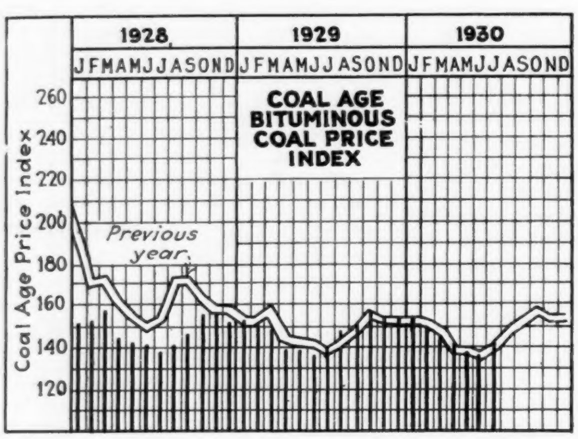
Caldwell Screw Conveyor Drives. Link-Belt Co., Chicago. Book No. 1191; 32 pp., illustrated. Typical installations are shown and engineering data enabling one to select the drive for his purpose are included.

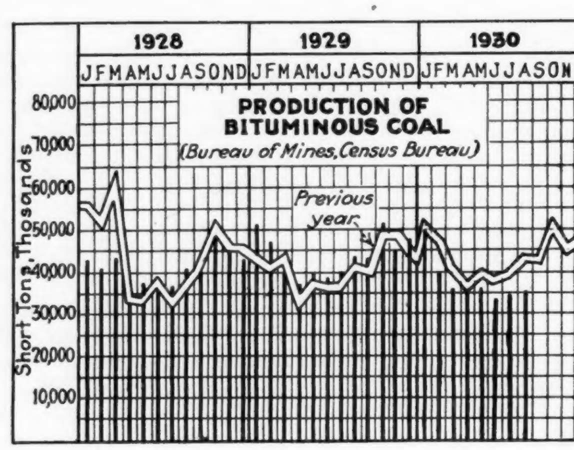
Pipe Manual. American Cast Iron Pipe Co., Birmingham, Ala. Eighth edition; 186 pp., illustrated. The book is divided into ten sections devoted to pipe and pipe fittings; standard specifications are also included.

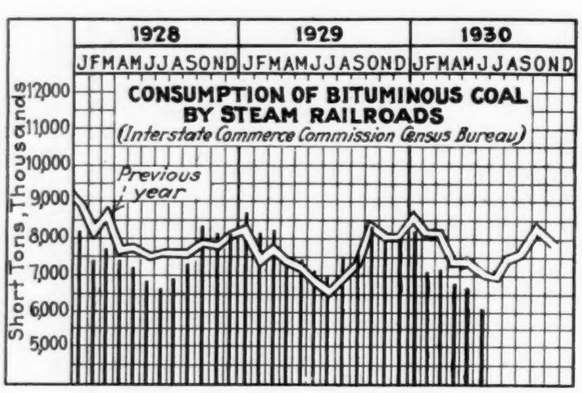
"Armco Ingot Iron Endures in Coal Mine Service" is the title of a folder issued by the American Rolling Mill Co., Middletown, Ohio, showing the various purposes of Armco ingot iron at coal-mining plants.

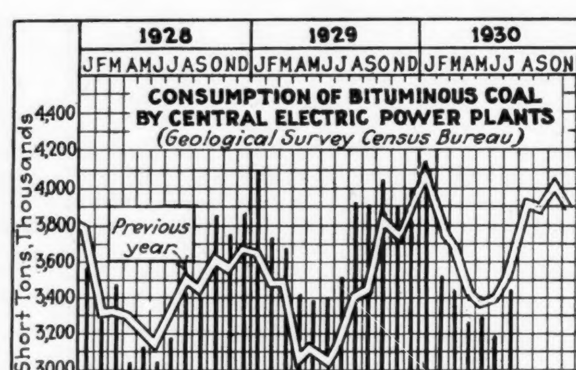
Indicators of Activities in the Coal Industry

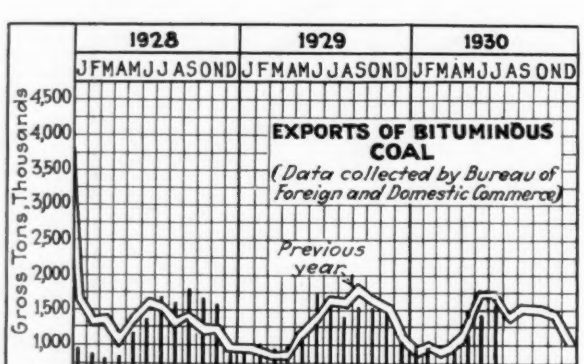


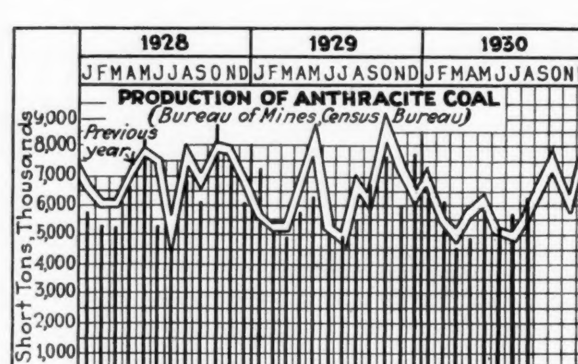












MARKETS in Review

IMPROVEMENT in the coal markets of the country in August was confined to the domestic sizes—and not to all of them. Large lump and block were the leaders, while, in a number of instances, egg, nut, and the smaller domestic sizes weakened both in demand and price. Steam sizes, particularly slack and screenings, were the stumbling block in the bituminous situation. These sizes were invariably hard to dispose of, and the unusually low ruling prices caused operators in many fields to curtail production rather than accept the prevailing quotations.

August production of bituminous coal is estimated by the U. S. Bureau of Mines at 35,344,000 net tons, an increase of 629,000 tons over the production in July and a decrease of 9,131,000 tons from the output in August, 1929. Anthracite production is estimated at 6,185,000 net tons for August. This compares with 5,658,000 tons in July and 5,735,000 tons in August of last year.

As a result of the anomalous price situation, the general level of quotations rose but slightly over that for July and was considerably below the average for August of last year. *Coal Age* Index of spot bituminous prices (preliminary) was: 142, Aug. 2; 140, Aug. 9; 141, Aug. 16; 142, Aug. 23; and 143, Aug. 30. Corresponding weighted average prices were: $1.72, Aug. 2; $1.70, Aug. 9; $1.71, Aug. 16; $1.72, Aug. 23; and $1.73, Aug. 30. Revised Index figures for July were: 141, July 5; 140, July 12; 142, July 19; and 141, July 26. Corresponding weighted average prices were: $1.71, July 5; $1.70, July 12; $1.72, July 19; and $1.71, July 26. The monthly Index for July was 141, as compared to the unrevised figure of 141⅗ for August.

Dumpings at the lower lake ports slackened slightly in August. Total dumpings for the season to Sept. 1 were 24,945,595 net tons, of which 864,394 tons was bunker fuel. In the same period in 1929, 24,027,941 tons of cargo coal and 925,310 tons of bunker fuel were dumped, a total of 24,953,251 tons.

Under pressure of price advances scheduled for Sept. 1, as well as the termination of the cash discount plan for prompt-paying buyers, anthracite demand became very active in the last ten days of August. Revival in demand in turn stimulated production, with the result that practically every company in the anthracite region was operating all of its collieries at practically full time. Buckwheat was the size most in demand, and, due to its scarcity, ordinarily commanded a premium in price.

HIGH-GRADE domestic sizes from practically all fields were in good demand in the Chicago bituminous market in August. On the other hand, steam sizes, particularly screenings and slack, were slow. As the operators showed a disposition to restrict production because of the low returns on slack, lump, egg, and nut were in some cases actually scarce. Lower freight rates and an advance of 25c. on prepared sizes stimulated demand for southern Illinois domestic grades. Old-line companies held screenings fairly steady at $1.35@$1.60, though there was some dumping at $1.10@$1.15. Secondary grades of screenings from Illinois, Indiana, and western Kentucky mines were weak throughout the month, despite the inability of producers to move large coal. A slight increase in Fifth Vein shipments brought screenings down to 65c., a price the central Illinois producers had to meet to move any coal to Chicago. Screenings from the Fourth Vein field were quiet and firm, owing to the limited output. Western Kentucky screenings were rather weak at 40c.@45c.

Smokeless operators were hard pressed for lump, egg, and stove shipments in August, largely because of the position of slack, which sold as low as 60c. Toward the end of the month, smokeless operators announced higher contract prices on prepared sizes and mine-run, as follows: lump and egg, $2.85@$3.10; and mine-run, $2.25. In the spot market, lump and egg sold at the maximum shippers could obtain, with many sales at $3.75 on lump and $4 on egg. Eastern high-volatile coals were in much the same position as smokeless varieties in regard to demand. Block was tight, but egg was soft and slack could not be moved.

AUGUST saw a progressive quickening in the demand for domestic sizes in the St. Louis market. High-grade lump and egg were sold well ahead, and the activity in the domestic field extended to the Mt. Olive, or Middle Grade, coals and, to a lesser extent, to the Standard varieties. Slack prices fell off in response to increased activity in domestic sizes.

The coal trade at the Head of the Lakes passed through another dull month in August, with predictions that the total shipments from the docks will be well below the July figure of 13,290 cars. Industrial demand lagged during the month, the chief support of the market being the power companies and municipalities. Contracting showed slight signs of improvement. Prices were unchanged from previous quotations.

Relief from the drought revived demand for coal somewhat in the Southwestern market in August. Arkansas

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Week Ended						
		Aug. 2, 1930		Aug. 9, 1930	Aug. 16, 1930	Aug. 23, 1930	Aug. 30, 1930	
	Market Quoted	Independent	Company	Independent	Independent	Independent	Independent	Company
Broken	New York	....	$8.45	....	....	....	....	$8.25
Broken	Philadelphia	....	....	....	....	....	....	....
Egg	New York	$8.50	8.50	$8.35@$8.50	$8.35@$8.50	$8.35@$8.50	$8.50	8.50
Egg	Philadelphia	8.50@ 8.75	8.50	8.50@ 8.75	8.50@ 8.75	8.50@ 8.75	8.50@ 8.75	8.50
Egg	Chicago*	7.41	7.41	7.41	7.59	7.59	7.59	7.59
Stove	New York	8.75@ 9.00	9.00	8.75@ 9.00	8.75@ 9.00	8.75@ 9.00	8.85@ 9.00	9.00
Stove	Philadelphia	9.00@ 9.25	9.00	9.00@ 9.25	9.00@ 9.25	9.00@ 9.25	9.00@ 9.25	9.00
Stove	Chicago*	7.86	7.86	7.86	8.04	8.04	8.04	8.04
Chestnut	New York	8.00@ 8.50	8.50	8.00@ 8.50	8.00@ 8.50	8.00@ 8.50	8.25@ 8.50	8.50
Chestnut	Philadelphia	8.50@ 8.75	8.50	8.50@ 8.75	8.50@ 8.75	8.50@ 8.75	8.50@ 8.75	8.50
Chestnut	Chicago*	7.41	7.41	7.41	7.59	7.59	7.59	7.59
Pea	New York	4.85	4.85	4.85	4.85	4.85	4.85	4.85
Pea	Philadelphia	4.85@ 5.10	4.85	4.85@ 5.10	4.85@ 5.10	4.85@ 5.10	4.85@ 5.10	4.85
Pea	Chicago*	4.11	4.11	4.11	4.29	4.29	4.29	4.29
Buckwheat	New York	3.00	3.00†	3.00	3.00	3.00	3.00@ 3.50	3.00†
Buckwheat	Philadelphia	3.00@ 3.25	3.00	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25	3.00
Rice	New York	1.65@ 1.85	2.00	1.65@ 1.85	1.70@ 1.90	1.70@ 2.00	1.70@ 2.00	2.00
Rice	Philadelphia	2.00@ 2.10	2.00	2.00@ 2.10	2.00@ 2.10	2.00@ 2.10	2.00@ 2.10	2.00
Barley	New York	1.15@ 1.40	1.50	1.15@ 1.40	1.15@ 1.40	1.25@ 1.50	1.25@ 1.50	1.50
Barley	Philadelphia	1.50@ 1.60	1.50	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60	1.50

*Net tons, f.o.b. mines. †Domestic buckwheat, $3.50 (D. L. & W.).

mines ran on a fairly good schedule, but Kansas deep-shaft mines deferred opening until Sept. 1. Kansas shovel lump advanced 25c. to $3, but screenings, under the influence of increased production, dropped 10c. to $1.75.

THE Colorado market, under the influence of warm weather, continued sluggish in August, with hand-to-mouth buying the rule. Prices were advanced during the month to the following: bituminous lump, $5.50; nut, $4.50; washed chestnut, $3.25; steam sizes, $1.25@$1.50; Crested Butte anthracite furnace, egg, and large base-burner sizes, $9; small base-burner sizes, $7; lignite lump, $4.25; Rock Springs-Kemmerer 7-in. lump, $4.25; 3-in. lump and grate, $4; nut, $3.75; steam sizes, $1.50.

Signs of improvement in the demand for block were discernible in the Louisville market in August, but lack of demand for egg, nut, 2-in. lump, and slack held back production. Slack, in particular, slumped materially during the month. Block quotations improved somewhat in the Hazard and Harlan fields, but failed to show a gain in the Elkhorn field or western Kentucky. Prices on lump, egg, and the smaller sizes from all fields were generally weaker over the month.

After a slow start at the first of August, domestic coals picked up in both price and movement in Cincinnati, due to an increase in orders for the future, as well in immediate requirements. On the other hand, total lack of interest in the smaller sizes sent them down to new low price levels. Working time at the mines was automatically curtailed to meet the situation, resulting in a large reduction in the available supply of lump and egg. An excellent demand for smokeless domestic coals was shared in by the high-volatile block and 4-in. and 6-in. lump coals. Price advances, while seasonal, were in part forced by the depressed market in the smaller sizes. In contrast to the interest in lump and block coals, egg and 2-in. lump were slow. Gas mine-run business was a trifle better, but steam business was weakened by the slack situation.

A marked improvement in the demand for domestic sizes, especially of the smokeless variety, featured the Columbus market in August and brought in its train materially higher prices, particularly on smokeless lump and egg, which advanced to $3.50@$3.75. Hocking and Pomeroy coals shared in the general advance, with the result that production increased slightly in these fields. Steam demand showed little change, though a slight increase in industrial takings just sufficed to absorb the increased supplies of screenings released by the greater production of larger sizes. Buyers pursued a hand-to-mouth policy. Screenings were fairly strong at the first of the month, but sagged later on, to recover at the last.

DULLNESS continued to pervade the Cleveland market in August. Demand for fuel sagged somewhat, though there was no perceptible change in the price level. Railroad consumption continued at a low level, and industries persisted in their refusal to stock coal.

There was a slight flurry in the domestic market in Pittsburgh at the beginning of August, which was accompanied by a drop in railroad and industrial demand to a new low level. Domestic demand disappeared after a few days, however, though industrial and railroad demand continued steady after finding its level. Domestic demand revived at the last, however, and was the most active development over the month. Steam slack was slow, while gas slack was steady. Mine-run and lump quotations showed a further slight decline at the end of the month, and steam slack was markedly weaker. Gas slack prices held firm. Connellsville byproduct coal, while not particularly active, had a fair shipping month, with no changes in quotations.

The last days of August brought a little improvement in the trade situation in northern West Virginia. Sales were below normal for the time of year, and even contract takings were slower than usual. Slack was the only size showing any change of note, dropping from its favored position in a slow market to a markedly weaker level.

A slight improvement, most noticeable in the demand for screened domestic sizes, was the chief feature in the central Pennsylvania market in August. There was little change from the

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

	Market	Week Ended				
LOW-VOLATILE, EASTERN	Quoted	Aug. 2, 1930	Aug. 9, 1930	Aug. 16, 1930	Aug. 23, 1930	Aug. 30, 1930
Smokeless lump	Chicago	$2.75@$3.25	$2.75@$3.25	$3.00@$3.50	$3.00@$3.50	$3.00@$3.50
Smokeless egg	Chicago	2.75@ 3.25	3.00@ 3.25	3.00@ 3.50	3.00@ 3.50	3.25@ 4.00
Smokeless stove	Chicago	2.25@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 3.00
Smokeless pea	Chicago	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25
Smokeless mine-run	Chicago	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Smokeless slack	Chicago	1.35@ 1.50	1.10@ 1.25	1.10@ 1.25	1.10@ 1.25	.70@ 1.25
Smokeless lump	Cincinnati	2.75@ 3.00	2.75@ 3.10	2.75@ 3.25	2.75@ 3.50	2.75@ 3.50
Smokeless egg	Cincinnati	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25	3.00@ 3.50	3.00@ 3.50
Smokeless stove	Cincinnati	2.25@ 2.75	2.25@ 2.75	2.25@ 2.75	2.25@ 2.75	2.25@ 2.75
Smokeless nut	Cincinnati	2.00	2.00@ 2.10	1.90@ 2.00	1.90@ 2.00	2.00@ 2.10
Smokeless mine-run	Cincinnati	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.85@ 2.00	1.85@ 2.00
Smokeless slack	Cincinnati	1.00@ 1.35	1.00@ 1.35	1.00@ 1.35	1.00@ 1.35	.75@ 1.35
*Smokeless nut-and-slack	Boston	4.10@ 4.15	4.10@ 4.15	4.05@ 4.10	4.00@ 4.10	3.85@ 4.00
*Smokeless mine-run	Boston	3.40@ 3.50	3.35@ 3.40	3.35@ 3.40	3.25@ 3.35	3.25@ 3.30
Clearfield mine-run	Boston	1.45@ 1.65	1.45@ 1.65	1.45@ 1.65	1.45@ 1.65	1.45@ 1.65
Clearfield mine-run	New York	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Cambria mine-run	Boston	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90
Somerset mine-run	Boston	1.55@ 1.75	1.55@ 1.75	1.55@ 1.75	1.55@ 1.75	1.55@ 1.75
Pool 1 (Navy Standard)	New York	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Pool 1 (Navy Standard)	Philadelphia	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Pool 9 (super low-vol.)	New York	1.85@ 2.10	1.85@ 2.10	1.85@ 2.10	1.85@ 2.10	1.85@ 2.10
Pool 9 (super low-vol.)	Philadelphia	1.80@ 2.10	1.80@ 2.10	1.80@ 2.10	1.80@ 2.10	1.80@ 2.10
Pool 10 (h. gr. low-vol.)	New York	1.75@ 2.00	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90
Pool 10 (h. gr. low-vol.)	Philadelphia	1.70@ 2.00	1.70@ 2.00	1.70@ 2.00	1.70@ 2.00	1.70@ 2.00
Pool 11 (low-vol.)	New York	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Pool 11 (low-vol.)	Philadelphia	1.45@ 1.65	1.45@ 1.65	1.45@ 1.65	1.45@ 1.65	1.45@ 1.65
HIGH-VOLATILE, EASTERN						
Pool 54-64 (gas and st.)	New York	$1.05@$1.25	$1.05@$1.20	$1.00@$1.20	$1.00@$1.20	$1.00@$1.20
Pool 54-64 (gas and st.)	Philadelphia	1.10@ 1.30	1.10@ 1.30	1.10@ 1.30	1.10@ 1.30	1.10@ 1.30
Pittsburgh sc'd gas	Pittsburgh	1.75@ 1.90	1.75@ 1.85	1.70@ 1.80	1.70@ 1.80	1.70@ 1.80
Pittsburgh gas mine-run	Pittsburgh	1.60@ 1.70	1.60@ 1.70	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60
Pittsburgh mine-run	Pittsburgh	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60
Pittsburgh slack	Pittsburgh	.90@ 1.00	.90@ 1.00	.90@ 1.00	.90@ 1.10	1.00@ 1.10
Connellsville coking coal	Pittsburgh	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Westmoreland lump	Philadelphia	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Westmoreland egg	Philadelphia	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85	1.75@ 1.85
Westmoreland ¾-in. lump	Philadelphia	1.80@ 1.90	1.80@ 1.90	1.80@ 1.90	1.80@ 1.90	1.80@ 1.90
Westmoreland mine-run	Philadelphia	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75
Westmoreland slack	Philadelphia	1.05@ 1.25	1.05@ 1.25	1.05@ 1.25	1.05@ 1.25	1.05@ 1.25
Fairmont lump	Fairmont	1.50@ 2.00	1.50@ 2.00	1.40@ 1.90	1.40@ 1.90	1.40@ 1.90
Fairmont ¾-in. lump	Fairmont	1.30@ 1.60	1.30@ 1.60	1.25@ 1.55	1.25@ 1.50	1.25@ 1.50
Fairmont mine-run	Fairmont	1.10@ 1.25	1.10@ 1.25	1.15@ 1.35	1.15@ 1.35	1.15@ 1.35
Fairmont slack	Fairmont	.90@ 1.00	.90@ 1.00	.80@ .95	.80@ .95	.75@ .90
Kanawha lump	Cincinnati	1.65@ 2.00	1.65@ 2.00	1.70@ 2.10	1.75@ 2.25	1.75@ 2.50
Kanawha egg	Cincinnati	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60
Kanawha nut-and-slack	Cincinnati	.90@ 1.10	.85@ 1.10	.85@ 1.00	.85@ 1.00	.85@ 1.00
Kanawha mine-run (gas)	Cincinnati	1.35@ 1.50	1.35@ 1.50	1.40@ 1.50	1.40@ 1.50	1.40@ 1.50
Kanawha mine-run (st.)	Cincinnati	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Williamson (W. Va.) lump	Cincinnati	1.60@ 2.00	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.75@ 2.00
Williamson (W. Va.) egg	Cincinnati	1.40@ 1.60	1.40@ 1.65	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60
Williamson (W. Va.) nut-and-slack	Cincinnati	.90@ 1.10	.90@ 1.10	.85@ 1.00	.85@ 1.00	.80@ 1.00
Williamson (W. Va.) mine-run (gas)	Cincinnati	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.35@ 1.60
Williamson (W. Va.) mine-run (st.)	Cincinnati	1.10@ 1.35	1.10@ 1.40	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Logan (W. Va.) lump	Cincinnati	1.60@ 1.75	1.65@ 1.85	1.65@ 1.90	1.65@ 1.90	1.70@ 2.00
Logan (W. Va.) egg	Cincinnati	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.60
Logan (W. Va.) nut-and-slack	Cincinnati	.85@ 1.00	.85@ 1.00	.85@ 1.00	.80@ 1.00	.75@ 1.00
Logan (W. Va.) mine-run	Cincinnati	1.10@ 1.40	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Logan (W. Va.) slack	Cincinnati	.50@ .90	.50@ .85	.50@ .75	.50@ .75	.50@ .75
Hocking (Ohio) lump	Columbus	1.90@ 2.00	1.90@ 2.00	1.90@ 2.00	1.90@ 2.00	1.90@ 2.00
Hocking (Ohio) nut-and-slack	Columbus	.90@ 1.00	.85@ 1.00	.85@ 1.00	.80@ .95	.80@ .95
Hocking (Ohio) mine-run	Columbus	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65
Pitts. No. 8 (Ohio) lump	Cleveland	1.40@ 1.75	1.35@ 1.75	1.25@ 1.75	1.25@ 1.70	1.30@ 1.60
Pitts. No. 8 (Ohio) ¾-in. lump	Cleveland	1.25@ 1.50	1.40@ 1.45	1.35@ 1.45	1.30@ 1.35	1.40@ 1.45
Pitts. No. 8 (Ohio) mine-run	Cleveland	1.15@ 1.65	1.35@ 1.65	1.30@ 1.65	1.25@ 1.65	1.20@ 1.30
Pitts. No. 8 (Ohio) slack	Cleveland	.75@ .85	.75@ .85	.80@ .90	.80@ .85	.60@ .80

*Gross tons, f.o.b. vessels, Hampton Roads.

price level prevailing in previous months.

August demand for steam coal fell off materially in the New England market. Accumulations at Hampton Roads were correspondingly increased and prices were depressed to $3.85@$4 for first-grade smokeless mine-run, f.o.b. vessels. Nut-and-slack also slumped markedly in the last half of the month, with some coal going at $3.25 on board vessels at Hampton Roads. All-rail shipments from central Pennsylvania picked up at the end of the month, due largely to an increased demand for domestic sizes.

THE Birmingham market passed through another dull month in August, with light demand for all grades of domestic coal. However, there was a slight increase in orders booked and shipments made at the last of the month in anticipation of price advances. New prices were scheduled for Sept. 1, as follows: Cahaba lump, $4@$4.75; nut, $3.75; Black Creek lump, $4.50@$4.75; nut, $3.50; Corona lump and egg, $3.25; nut, $2.75; Big Seam lump and egg, $2.25; nut, $2; Carbon Hill lump and egg, $2.50; nut, $2@$2.50; Montevallo - Aldrich lump and egg, $5.75; nut, $3.50; Straven lump, $4.75; nut, $3.25; Dogwood lump, $5.50. Steam business continued at a low level, with no change in prices from July.

Little improvement was noticeable in the steam trade in New York in August. Industrial and railroad consumption was subnormal, though some power plants took larger tonnages than usual, on account of the drought. Retail dealers in the all-rail territories, on the other hand, began to take larger tonnages of the domestic sizes. For the most part, consumers stuck to hand-to-mouth buying, but at the end of the month a few requests for increased shipments on contracts were received and a slightly larger number of orders appeared in the spot market. Mine-run quotations were unchanged, but low-volatile lump advanced 25c.@50c. Larger tonnages of this variety resulted in an over-supply of slack, which unsettled prices.

August proved to be another dull month in the Philadelphia market. Buying for storage continued at a low rate. Bunkering was the chief activity at tidewater, and even this was not up to normal for the time of year. Prices tended to weaken as the month wore on.

Such activity as developed in the New York anthracite market was crowded into the last ten days of August. Sept. 1 marked the date of the final 15c. advance in mine prices, as well as the termination of the cash discount of 25c. for payment within 15 days. Consequently, a number of prompt-pay dealers bought in August, resulting in a sharp increase in the number and size of orders. Producers were able to market practically full output in the last ten days. No. 1 buckwheat was very scarce and independents were able to obtain a premium over the $3 circular, with some sales reported at $3.25@$3.50. Rice and barley were easy, with tonnage available at 25c. below circular.

As in New York, activity in the Philadelphia anthracite market was stimulated by anticipation of the price advance on Sept. 1, as well as the termination of the cash discount plan. Chestnut was the favored size over the month. Buckwheat led the steam sizes.

Exports of coal and coal products in July, the latest month for which figures are available, were as follows: bituminous coal, 1,585,809 gross tons, as compared to 1,393,911 tons in June and 1,739,587 tons in July last year; anthracite, 129,033 gross tons, as compared with 143,551 tons in the preceding month and 197,491 tons in the month of July, 1929; coke, 10,430 gross tons, compared with 67,847 tons in June, 1930, and 83,730 tons in July, 1929. Canada, as usual, was our best customer, taking 1,453,218 gross tons of bituminous coal, an increase of 170,111 gross tons over the June figure and a decrease of 81,467 gross tons from the total in July, 1929.

Imports in July, 1930 and 1929, were: 9,315 and 28,331 gross tons of bituminous coal, respectively; 28,671 and 33,417 gross tons of anthracite, respectively, and 10,430 and 16,714 gross tons of coke, respectively. Canada led in the imports of bituminous coal in July, with 9,315 gross tons.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

	Market Quoted	Week Ended Aug. 2, 1930	Aug. 9, 1930	Aug. 16, 1930	Aug. 23, 1930	Aug. 30, 1930
MIDDLE WEST						
Franklin (Ill.) lump	Chicago	$3.00	$3.00	$3.00	$3.00	$3.00
Franklin (Ill.) egg	Chicago	2.50@ 2.85	2.50@ 2.85	2.50@ 2.85	2.50@ 2.85	2.50@ 2.85
Franklin (Ill.) mine-run	Chicago	2.15	2.15	2.15	2.15	2.15
Franklin (Ill.) screenings	Chicago	1.60@ 1.85	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60
Central Ill. lump	Chicago	1.90@ 2.25	1.90@ 2.25	1.90@ 2.25	1.90@ 2.25	1.90@ 2.25
Central Ill. egg	Chicago	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Central Ill. mine-run	Chicago	1.85@ 2.00	1.85@ 2.00	1.85@ 2.00	1.85@ 2.00	1.85@ 2.00
Central Ill. screenings	Chicago	1.00@ 1.25	.80@ 1.10	.80@ 1.10	.80@ 1.10	.75@ 1.10
Ind. 4th Vein lump	Chicago	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Ind. 4th Vein egg	Chicago	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Ind. 4th Vein mine-run	Chicago	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90
Ind. 4th Vein screenings	Chicago	1.10@ 1.40	1.10@ 1.50	1.10@ 1.50	1.10@ 1.50	1.10@ 1.50
Ind. 5th Vein lump	Chicago	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Ind. 5th Vein egg	Chicago	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Ind. 5th Vein mine-run	Chicago	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60	1.50@ 1.65
Ind. 5th Vein screenings	Chicago	.80@ 1.00	.60@ 1.15	.60@ 1.15	.70@ 1.10	.70@ 1.10
Mt. Olive (Ill.) lump	St. Louis	1.90@ 2.25	1.90@ 2.25	1.90@ 2.25	1.90@ 2.25	1.90@ 2.25
Mt. Olive (Ill.) egg	St. Louis	1.75@ 2.15	1.75@ 2.15	1.75@ 2.15	1.75@ 2.15	1.75@ 2.15
Mt. Olive (Ill.) mine-run	St. Louis	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Mt. Olive (Ill.) screenings	St. Louis	.80@ 1.00	.80@ 1.00	.80@ 1.00	.80@ 1.00	.80@ 1.00
Standard (Ill.) lump	St. Louis	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00	1.65@ 2.00
Standard (Ill.) egg	St. Louis	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90	1.65@ 1.90
Standard (Ill.) mine-run	St. Louis	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Standard (Ill.) screenings	St. Louis	.70@ .90	.70@ .90	.60@ .90	.60@ .90	.60@ .90
West Ky. lump	Louisville	1.35@ 1.50	1.35@ 1.50	1.35@ 1.75	1.35@ 1.75	1.35@ 1.75
West Ky. egg	Louisville	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50
West Ky. mine-run	Louisville	.90@ 1.25	.90@ 1.25	.90@ 1.25	.90@ 1.25	.85@ 1.25
West Ky. slack	Louisville	.45@ .70	.55@ .70	.40@ .75	.40@ .75	.35@ .60
West Ky. lump	Chicago	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50
West Ky. egg	Chicago	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50	1.35@ 1.50
West Ky. slack	Chicago	.60@ .70	.45@ .70	.45@ .70	.40@ .65	.40@ .65
SOUTH AND SOUTHWEST						
Big Seam lump	Birmingham	$2.25	$2.25	$2.25	$2.25	$2.25
Big Seam mine-run	Birmingham	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75
Harlan (Ky.) block	Chicago	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50
Harlan (Ky.) egg	Chicago	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Harlan (Ky.) slack	Chicago	.90@ 1.15	1.25@ 1.60	.90@ 1.00	.90@ 1.00	.90@ 1.00
Harlan (Ky.) block	Louisville	2.00@ 2.20	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25
Harlan (Ky.) egg	Louisville	1.60@ 1.85	1.60@ 1.85	1.60@ 2.00	1.50@ 1.75	1.40@ 1.75
Harlan (Ky.) nut-and-slack	Louisville	.90@ 1.10	.80@ 1.00	.80@ 1.00	.70@ 1.00	.70@ 1.00
Harlan (Ky.) mine-run	Louisville	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65
Harlan (Ky.) block	Cincinnati	1.75@ 2.25	1.75@ 2.25	1.75@ 2.50	1.75@ 2.75	1.75@ 2.75
Harlan (Ky.) egg	Cincinnati	1.40@ 1.70	1.35@ 1.65	1.35@ 1.65	1.35@ 1.65	1.35@ 1.65
Harlan (Ky.) nut-and-slack	Cincinnati	1.00@ 1.15	.90@ 1.10	.85@ 1.10	.85@ 1.10	.75@ 1.10
Harlan (Ky.) mine-run	Cincinnati	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60	1.25@ 1.60
Hazard (Ky.) block	Chicago	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25
Hazard (Ky.) egg	Chicago	1.30@ 1.75	1.30@ 1.75	1.30@ 1.75	1.30@ 1.75	1.30@ 1.75
Hazard (Ky.) slack	Chicago	.75@ 1.00	.75@ .90	.75@ .90	.75@ .90	.75@ .90
Hazard (Ky.) block	Louisville	1.75@ 1.85	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.00
Hazard (Ky.) egg	Louisville	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75	1.35@ 1.50
Hazard (Ky.) nut-and-slack	Louisville	.50@ .75	.50@ .75	.50@ .75	.50@ .75	.50@ .75
Hazard (Ky.) mine-run	Louisville	1.25@ 1.50	1.30@ 1.50	1.30@ 1.50	1.25@ 1.50	1.25@ 1.50
Hazard (Ky.) block	Cincinnati	1.65@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Hazard (Ky.) egg	Cincinnati	1.35@ 1.60	1.35@ 1.60	1.35@ 1.65	1.35@ 1.65	1.35@ 1.65
Hazard (Ky.) nut-and-slack	Cincinnati	.90@ 1.00	.85@ 1.00	.85@ 1.00	.80@ 1.00	.75@ 1.00
Hazard (Ky.) mine-run	Cincinnati	1.15@ 1.35	1.15@ 1.35	1.10@ 1.35	1.10@ 1.35	1.10@ 1.35
Elkhorn (Ky.) block	Chicago	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50	2.00@ 2.50
Elkhorn (Ky.) egg	Chicago	1.60@ 2.00	1.60@ 2.00	1.60@ 2.00	1.60@ 2.00	1.60@ 2.00
Elkhorn (Ky.) slack	Chicago	1.15@ 1.65	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25
Elkhorn (Ky.) block	Louisville	1.75@ 2.25	1.75@ 2.25	1.75@ 2.00	1.75@ 2.25	1.75@ 2.25
Elkhorn (Ky.) egg	Louisville	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.75	1.50@ 1.75
Elkhorn (Ky.) nut-and-slack	Louisville	.90@ 1.10	.80@ 1.00	.80@ 1.00	.70@ 1.00	.70@ 1.00
Elkhorn (Ky.) mine-run	Louisville	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50
Elkhorn (Ky.) block	Cincinnati	1.75@ 3.25	1.75@ 3.25	1.75@ 3.25	1.75@ 3.25	1.75@ 3.25
Elkhorn (Ky.) egg	Cincinnati	1.45@ 2.00	1.40@ 2.00	1.40@ 2.00	1.40@ 2.00	1.40@ 2.00
Elkhorn (Ky.) nut-and-slack	Cincinnati	.90@ 1.15	.90@ 1.10	.90@ 1.10	.90@ 1.10	.90@ 1.10
Elkhorn (Ky.) mine-run	Cincinnati	1.15@ 1.60	1.15@ 1.60	1.15@ 1.60	1.15@ 1.60	1.15@ 1.60
Kansas shaft lump	Kansas City	3.50	3.50	3.50	3.50	3.50
Kansas strip lump	Kansas City	3.00	3.00	3.00	3.00	3.00
Kansas mine-run	Kansas City	2.50	2.50	2.50	2.50	2.50
Kansas screenings	Kansas City	1.75	1.75	1.75	1.75	1.75

WORD from the FIELD

Illinois Rates Argued

Selection of a committee of coal operators, railroad officials, and consumers in Illinois to study intrastate freight rates with the object of negotiating new tariffs on Illinois coal was decided on as a means of settling the coal rate controversy in that state at a meeting in Chicago, Sept. 6, attended by about 79 representatives of the different interests. The conference was called by R. N. Tresize, examiner for the Interstate Commerce Commission, in an effort to settle without trial the railroads' complaint against intrastate rates on Illinois coal and the Illinois Coal Traffic Bureau complaint on rates from southern Illinois to Chicago.

Virginia Development Started

Drilling was started at Laurel Hill, Scott County, Va., last month in an effort to develop oil and gas thought to exist in large quantities in that section. Included in the area to be prospected is the 30,000-acre property of the Clinch River Coal Co., Inc., Bristol, Va., containing reserves estimated at 500,000,000 tons of steam and byproduct coal. Three mines of the Clinch River company are now operating in the tract at Dungannon, Va. Coincident with the oil and gas development, which will be carried on by the Davis Elkins Co., a West Virginia concern, the coal company contemplates operation of its coal reserves on a large scale, basing its program on the drillers' findings. Five coal seams are known to exist on the tract operated by the Clinch River company, which states that they are easily accessible for operation and offer an unexcelled opportunity for low-cost production.

Anthracite Research Scheduled

Lehigh University, Pennsylvania State College, and Yale University will participate in an intensive and exhaustive study of Pennsylvania anthracite, according to an announcement made Aug. 18 by Noah H. Swayne, executive director, Anthracite Institute. By arrangement with Lehigh University, Bethlehem, Pa., Prof. Homer G. Turner, an authority on Pennsylvania hard coals, has been appointed director of anthracite research, and will devote much of his time in the next few years to that subject.

The first task of Professor Turner will be listing and sampling the different veins of anthracite in the Wyoming basin in and around Scranton and Wilkes-Barre, Pa.; the Lehigh basin in the neighborhood of Hazleton, Pa., and the Schuylkill basin in the vicinity of Pottsville, Pa. As a part of the program to supplement the work at Lehigh, research fellowships will be established at Pennsylvania State College, State College, Pa., and Yale University, New Haven, Conn. New uses for anthracite is one of the ultimate objectives of the program.

Business Improvement Lags

Business improvement, in evidence since July, is beginning to lose momentum, because of lack of support, according to *The Business Week* of Sept. 10, which says: "The slow, uncertain, seasonal upturn in business from the low point at the end of July shows signs of beginning to lag alarmingly under the weight of widespread inertia of financial leadership and business initiative. After rising steadily for three weeks, our index of general business activity has fallen back sharply from 89.1 per cent of normal to 86.5 per cent, the lowest so far reached.

"Although steel and coal production, freight movement, and currency in circulation continue to respond fairly strongly to expanding seasonal demand, building, electric power output, commercial borrowing, and general trade have turned unseasonally slack. After the promising check to falling commodity prices in August, they have again weakened, as the Federal Reserve has relaxed its open-market pressure toward credit expansion. Despite deepening depression and disturbance abroad, no moves are being made to rescue business from the bears' claws, and the stock market refuses to advance in face of them. These are the decisive days that will determine whether the relatively mild recession so far is to settle into stubborn stagnation or swing into strong recovery."

National Safety Council to Meet

A comprehensive program embracing all phases of safety will be offered delegates to the annual meeting of the mining section of the National Safety Council, to be held at Pittsburgh, Pa., Sept. 29-Oct. 3. At the opening session, on the morning of Sept. 29, the following topics will be discussed: "Safety Responsibility of Management," T. G. Fear, general manager, Consolidation Coal Co., Fairmont, W. Va.; W. H. Comins, National Lead Co., St. Francois, Mo.; and J. B. Warriner, president, Lehigh Navigation Coal Co., Lansford, Pa.; "Safety Responsibility of the Foreman, Shift or Face Bosses," A. R. Pollock, general manager of mines, Ford Collieries Co., Curtisville, Pa., and V. V. DeCamp, United Verde Copper Co., Jerome, Ariz.

The question box, in charge of F. C. Dunbar, general manager, Mather Collieries Co., Mather, Pa., will be a feature of the afternoon session on Sept. 29. P. G. Beckett, vice-president, Phelps Dodge Corporation, Douglas, Ariz., will speak on "Some Fundamental Requirements in Accident Prevention Work," and W. D. Brennan, president, Utah Fuel Co., is scheduled for an address on "Methods of Educating the Workman."

Wednesday morning, Oct. 1, will be set aside for a trip to the U. S. Bureau of Mines experimental mine and explosives testing station at Bruceton, Pa. In the afternoon, addresses will be given as follows: "Safety Organization for a Small Company," D. L. Boyle, superintendent of mines, Associated Gas & Electric System, Johnstown, Pa., and "Safety Organization for a Large Company," Carl T. Hayden, general manager, O'Gara Coal Co., Chicago. The question box will be in charge of Mr. Dunbar.

"Problems of State Mine Inspectors," will be discussed in the morning of Oct. 2 by W. H. Glasgow, Secretary of Mines for Pennsylvania, Harrisburg, Pa.; R. M. Lambie, chief of the West Virginia Department of Mines, Charleston, W. Va.; J. F. Daniel, chief of the Kentucky Department of Mines, Frankfort, Ky.; W. B. Hillhouse, chief mine inspector for Alabama, Birmingham, Ala.; and J. G. Millhouse, chief mine inspector for Illinois, Springfield, Ill. Mr. Dunbar will again be in charge of the question box. Introduction of the incoming chairman and his staff will conclude the business sessions.

Labor Quarrels Flare Up in August; Anthracite Pact Signed

RATIFICATION of the new five-year wage agreement by the anthracite miners was the first event on the August labor calendar. Representatives of Districts 1, 7, and 9 of the United Mine Workers met at Scranton, Pa., Aug. 4, to consider the new pact brought back by the scale committee after the conclusion of negotiations with the operators' committee in New York City, July 18. The tri-district convention ratified the agreement on Aug. 7, by a vote of 737 to 127, after John L. Lewis, international president, had dispelled a major part of the opposition previously manifested by labor delegates.

Bituminous labor troubles continued to spread last month. In western Kentucky, differences between the operators and miners, which began with the reopening of mines in Webster County on July 1, after a shutdown of three months, were punctuated by shooting and dynamiting. On Aug. 11, mines of the Ruckmann Coal Co., Diamond Coal Co., and Meador, Young & Holt Coal Co., at Providence and Clay, Ky., were bombed from an airplane. Nine charges of explosives were dropped, but there was little property damage and no fatalities. Paul Montgomery, Murphysboro (Ill.) aviator was arrested on Aug. 12, and, it is alleged, confessed on Aug. 13 that he piloted the plane. Official investigation resulted in the arrest of nine additional men from Kentucky and Illinois, who, with Montgomery, will be tried in the federal court at Louisville, Ky.

Fire, said to have been set by strikers as an act of retaliation against officials who assisted in the identification of Montgomery, destroyed the tipple at No. 3 mine of the Providence Coal Mining Co., Providence, Ky., Aug. 14. On the previous night, an Illinois Central R.R. bridge thirteen miles west of the town, was dynamited. After a short period of quiet, Providence was again the scene of dynamiting. The charges, however, were fired on vacant lots and did no damage. On the following night, three poles of the Kentucky Utilities Co. were blasted, throwing the town into darkness and forcing the Hartego mine to close the following day. Considerable shooting was done in Providence while the streets were dark.

Labor difficulties spread to Hopkins County on the night of Sept. 2, when strikers fired into a home on the property of the Norton Coal Mining Co., near Nortonville. Charles Blanchard, mine superintendent, who started to the scene with a machine gun, was ambushed and wounded slightly, but set up the gun and drove off the attackers. In the meantime, the party shooting at the camp was driven off by a force headed by J. B. Ashley, watchman.

On Sept. 3, Federal Judge Charles I. Dawson, Louisville, dismissed Carson Howard and John Pearson, two Providence miners, who were charged with violating the terms of an injunction granted in July. On the previous day, Judge Dawson sentenced Onis Low and Fred Blackwell, also of Providence, to 60 days in jail, after their conviction on charges of violating the injunction. Cases of nineteen other men, charged with banding together and intimidating workers at Providence have been set for trial at the September term of court, in Madisonville, Ky.

Continuance of the quarrel between the regular and insurgent factions of the United Mine Workers brought the rebel faction into the disfavor of the courts in Illinois. On Aug. 13, Circuit Judge J. C. Kern, Benton, Ill., granted fifteen individual miners, members of local unions in Franklin County, a temporary injunction against the insurgents. Alexander Howat, Springfield, Ill., president of the organization; Harry Fishwick, president of District 12, and all members of the state and national board elected at the Springfield convention, were enjoined from using the name of the United Mine Workers of America.

IN addition, the injunction restrains the insurgent officials from using the name of District 12; claiming that the association organized at Springfield is the original union; spending funds paid to the United Mine Workers as dues; claiming that wage agreements between the coal companies and the union belong to them, and using the constitution of the United Mine Workers. Miners who obtained the injunction claimed to be members of the original union. Legal attack was begun on the injunction in the court of Judge Frank H. Hooper, Watseka, Ill., Sept. 5, following a change of venue from Franklin County.

William Green, president, American Federation of Labor, took a hand in the Illinois imbroglio when, on Aug. 5, he addressed a letter to Victor A. Olander, secretary, Illinois State Federation of Labor, Chicago, requesting him to refuse to seat delegates to the state federation convention, Springfield, Sept. 15, elected by the insurgent group.

One of the developments of the month in Illinois was the decision of Harry Fishwick, Springfield, Ill., president of District 12, and a leader in the insurgent revolt against John L. Lewis, to retire as leader of the Illinois miners. Mr. Fishwick announced on Aug. 6 that he would not be a candidate in the fall election, and gave as his reason the fact that he was entitled "to a rest from arduous tasks."

Seventy-one delegates, including men identified with both the regular and insurgent groups of the United Mine Workers, attended a miners' peace meeting, at Belleville, Ill., Aug. 26. The object of the meeting, it was announced, was to bring back harmony in the ranks of the Illinois union, though the meeting broke up without definite action being taken.

An undercurrent of Communistic disturbance, which has gained strength by reason of factional differences, is reported to be running through the Illinois coal fields. Instead of breaking out in strikes and riots, the movement is said to be reflected mostly in sabotage and "soldiering." Local unions affiliated with both the regular and insurgent factions of the United Mine Workers are said to be affected, and leadership is so well concealed that operators are finding difficulty in coping with the problem. Both the Lewis and Fishwick groups assert that the National Miners' Union, Pittsburgh, Pa., is providing assistance and guidance in the movement.

The quarrel between Michael Ferguson and William Mitch, president and secretary, respectively, of District 11, Indiana, on one side, and William Jardine and John Thompson, Terre Haute, Ind., on the other, went before the international executive board of the United Mine Workers last month. Both sides accuse each other of treason in dealings with the insurgents. The hearing before the board struck a snag when Jardine and Thompson refused to testify because, they asserted, permission to have a stenographer was denied them. Ferguson and Mitch detailed their case against their opponents.

The insurgents launched a campaign to organize miners in West Virginia with a meeting in Huntington, W. Va., last month, attended by J. H. Walker, Springfield, Ill., secretary-treasurer of the group; Frank Keeney, former president of District 17, West Virginia; Harold Houston, Charleston, W. Va., former attorney for the union; and B. M. Flaherty, Sawyersville, Ill., a former official of the West Virginia organization. Keeney was made chief representative in charge of organizing West Virginia and opened headquarters a short time later in the Deveny Building in Fairmont, W. Va. Attempts will be made to organize the Fairmont and Kanawha fields in particular and to negotiate district agreements with the operators, it was announced.

MINERS at the Pursglove mine of the Connellsville By-Product Coal Co., in the Scotts Run region of northern West Virginia, walked out in the middle of August because of a new "clean-up" system installed at the mine, under which loaders are expected to finish their work regardless of how long it takes them, with, however, compensation on the basis of an eight-hour day. About 300 men were included in the walkout.

Approximately 900 miners employed in the two mines of the Simpson Creek Collieries Co., Galloway, W. Va., in northern West Virginia, started work on July 30 under a new wage scale slightly under the previous one. Company officials promulgated the new scale to meet competition. All of the men continued at work. In Maryland, em-

ployees at the Jackson mine of the American Coal Co., Lonaconing, Md., went on strike early last month in protest against a cut in loading payments of from 65c. to 58c. per ton. Employees had been at work only a few weeks after the termination of a previous strike.

British Columbia Group Meets

Means of stimulating the declining British Columbia coal trade was the theme of a conference of producing and consuming interests in the province, which convened at Victoria, B. C., Aug. 7, in response to a call by W. A. McKenzie, Minister of Mines. Mr. McKenzie reviewed the plight of the British Columbia coal industry and assigned as the chief reason the competition of other efficient and strongly merchandised heating mediums, notably fuel oil. He stated that the four principal reasons for calling the conference were: to acquaint all interests with the situation; induce the railroads to discontinue the use of fuel oil; decide on the feasibility of appointing a permanent committee to work for the extension of the British Columbia market; and to bring home to utilities the desirability of promoting the use of coal.

Proposals for a tariff of 2c. a gallon on fuel oil were defeated, but the conference approved the appointment of the permanent committee to foster the use of coal. Following the conference, Mr. McKenzie asked interested groups to send representatives to a meeting in Victoria, Aug. 20, for the purpose of selecting the personnel and perfecting the permanent organization of the committee.

New River Smokeless Sold

Mining properties of the New River Smokeless Coal Co. at Lookout and Fayette, W. Va., were sold last month at less than one-tenth of their appraised value of $235,000. All the property, leaseholds, and improvements at Lookout were purchased by H. W. Todd, Phillipsburg, Pa., a trustee of the John Nuttall estate, for $14,000. The Michigan mine property and leaseholds at Fayette went to the Mountain State Realty Co., a southern West Virginia concern, for $2,005. A power plant and equipment owned by the coal company were sold to C. E. Mahan, Jr., trustee on one of the deeds, for $3,000.

Gilbert-Davis to Be Sold

Trustees of the bankrupt Gilbert-Davis Coal Co., Morgantown, W. Va., operating mines at Cassville, Gilbert, and Morgantown, in the Scotts Run field in northern West Virginia, have decided to abandon efforts to operate the properties and will sell all the equipment. Creditors of the company met at Morgantown, W. Va., Aug. 22, to elect a committee and enter into an agreement giving it power to act.

Canadian Blast Kills Forty-Five

Forty-five men were killed in an explosion in the Coalmont Collieries mine of Coalmont Collieries, Ltd., Blakeburn, B. C., the night of Aug. 13. Only a few of the number were killed by the force of the explosion, most of the men succumbing to the effects of afterdamp after rescue efforts had failed to reach them in time.

Falls of rock made penetration into the mine difficult when it was attempted immediately after the blast and, after the fan had been repaired and put back in service, a fire broke out on Aug. 15, effectually stopping the rescue work and causing officials to abandon hope for the men still in the mine. Only one man of the 46 at work at the time survived.

Reading Company Changes

Four changes in the operating personnel of the Mahanoy division have been made by the Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., the changes being incidental to a program of reorganization and development of production for the new central breaker to be erected at St. Nicholas, Pa. Patrick J. Quigley, who has been serving as general superintendent of the division, has been made superintendent of the Hammond Colliery, near Girardville, Pa. Peter Schnee, formerly superintendent at Hammond, becomes inside foreman. At the Maple Hill Colliery, John Schuster, superintendent, has been made inside foreman, charged with the intensified development of production.

Arthur Teasdale, formerly of the Berwind-White Coal Mining Co., Scalp Level, Pa., has been made superintendent at Maple Hill. Ralph Kirk, for several years connected with the H. C. Frick Coke Co., at Brownsville, Pa., has joined the Reading company as superintendent of the Mahanoy division.

Fire Destroys Tipples

The tipple and rescreening plant at Mine No. 7 of the Consolidated Coal Co. of St. Louis, at Herrin, Ill., were destroyed on Aug. 26 by a fire believed to have been caused by spontaneous combustion. The mine normally produces about 2,000 tons per day. Plans are under way for immediately rebuilding the structures.

The tipple, power plant, and all the surface plant of the Emerald Coal Co., Rockport, Ky., were destroyed by a fire of undetermined origin on the night of Sept. 2. The blaze started in a coal bin in the boiler plant, and caused a loss estimated at $150,000 to $200,000.

The tipple and coal-washing plant of the Keystone Coal & Coke Co., near Greensburg, Pa., was ignited by a lightning stroke Sept. 2 and burned to the ground with an estimated loss of $300,000. The mine employs about 300 men, who will temporarily be thrown out of work.

Fire, said to have been set by striking miners, destroyed the tipple at the No. 3 mine of the Providence Coal Mining Co., Providence, Ky., Aug. 14, with a loss estimated at $50,000. No. 3 mine is one of those which closed down on April 1, but failed to reopen with the others in Webster County on July 1. It employed 200 men at the time it closed.

New Mine Being Opened

Construction work on the new mine of the Pardee-Curtin Lumber Co., near Gregory siding, about three miles from Webster Springs, W. Va., is nearing completion. The mine will be one of the major operations in the new Sewell field in the upper Elk River Valley. A mine tipple is well under way, an incline is being constructed, and tracks are being laid preparatory to operation on Nov. 1. Full electrical equipment will be installed, and the completed operation is expected to produce a maximum of 3,000 tons per day. Shipment will be made over the Western Maryland R.R., through Elkins, W. Va.

Maryland to Push Its Coal

Plans for the organization of an incorporated association to promote the use of Maryland-mined coal in Maryland were laid at a meeting at the Fort Cumberland Hotel, Cumberland, Md., last month, attended by representatives of operating companies, business organizations in the Georges Creek field, and state officials. John S. Brophy, president, Piedmont & Georges Creek Coal Co., Frostburg, Md., was elected chairman of the group, and named committees to complete the corporate organization of the association.

Iowa Interests Meet

Representatives of the Iowa Coal Institute and the Iowa Coal Operators' Association met at a conference in Des Moines, Iowa, Aug. 15, to devise plans for a campaign to stimulate the sale of Iowa coal. The campaign evolved has as its objective the protection of the Iowa coal industry from out-of-state competition, and will be carried out under the auspices of the institute. An advisory committee, consisting of representatives of the operators and miners, headed by George Heaps, Jr., Albia, Iowa, president of the Iowa Coal Operators' Association, was named to assist in the work.

Hillman Buys Mine

The Edward mine of the Chartiers Southern Coal Co., near Clarksville, Pa., has been sold to the Hillman Coal & Coke Co., Pittsburgh, Pa. Included in the deal was 800 acres of coal land. The Edward mine, which has been idle since June 1, employs 300 men when in operation, and the consideration is said to have been approximately $1,000,000.

Merchandising Theme of N. C. A. Annual Meeting; Stoker Exhibit Planned

MARKETING of coal and the problems connected with it will be the major theme for discussion at the thirteenth annual meeting of the National Coal Association, to be held at the Book-Cadillac Hotel, Detroit, Mich., Oct. 15-17. However, merchandising will not alone occupy the attention of delegates to the convention, as a survey of the future from production, marketing, and financial standpoints will be the subject for one session of the three-day meeting. Anti-injunction legislation, the relation of the coal producers and the railroads, and the trade-practice movement have been singled out for attention. In addition, an exhibition of domestic stokers for burning bituminous coal will be an innovation at this year's meeting.

F. F. Taggart, president, Spruce River Coal Co., Ramage, W. Va., will preside at the initial session in the morning of Oct. 15. Safety activities will be discussed by Ezra Van Horn, Cleveland, Ohio, vice-president of the Clarkson Coal Mining Co. and chairman of the association's safety committee. T. W. Harris, Jr., Wilmington, Del., division purchasing agent, E. I. duPont de Nemours & Co., Inc., and chairman, fuel committee, National Association of Purchasing Agents, will discuss "Classification of Coal From the Consumers' Standpoint." Seven well-known operators will address the local association luncheon meeting, immediately following the first session. H. R. Hawthorne, New York City, secretary and general counsel, Pocahontas Fuel Co., Inc., will preside.

At the second session, in the morning of Oct. 16, with W. D. Brennan, Salt Lake City, president, Utah Fuel Co., presiding, Walter Barnum, New York City, president, Pacific Coast Co., and H. A. Glover, New York City, general manager of sales, Consolidation Coal Co., will report on the activities of the Market Research Institute and the trade relations section of the association, respectively. Following the reports, four addresses will be given: "Heat Service Through Solid Fuels," E. B. Langenburg, St. Louis, Mo., president, Langenburg Mfg. Co. and vice-president, Committee of Ten—Coal and Heating Equipment Industries; "The Stoker," E. L. Beckwith, Chicago, president, Midwest Stoker Association; "Co-operation of the Retail Merchant," Milton E. Robinson, Jr., president, National Retail Coal Merchants' Association; and "Smoke Abatement," Frank A. Chambers, Chicago, chief coal inspector for the city and secretary, Smoke Prevention Association of the United States.

Exploring the road to the future will occupy delegates at the afternoon session, which will be presided over by H. L. Findlay, Cleveland, Ohio, vice-president, Youghiogheny & Ohio Coal Co. "What's Ahead in Production" will be discussed by John B. Dilworth, Philadelphia, Pa., representing the E. V. d'Invilliers Engineering Co. The future of marketing will be taken up by a speaker not yet selected, while Col. James L. Walsh, Detroit, Mich., an officer of the Guardian Detroit Bank, will present the bankers' side of the question.

"Anti-Injunction Legislation" will be the subject of the first talk on the program for the last session, in the morning of Oct. 17, with A. J. Moorshead, Chicago, president, Madison Coal Corporation, presiding. Attorney Henry Adamson, Terre Haute, Ind., will be the speaker. Following Mr. Adamson, T. Duff Smith, Cleveland, Ohio, lake forwarding agent, Canadian National Railways, and former president of the International Railway Fuel Association, will speak on "The Relations Between the Coal Producers and the Railroad Companies as Affected by the International Railway Fuel Association." E. C. Mahan, Knoxville, Tenn., president, Southern Coal & Coke Co., and chairman of the association's trade-practice group, will take up the matter of trade-practice codes. Mr. Mahan will be followed by Abram F. Myers, attorney, Washington, D. C., and former chairman of the Federal Trade Commission, who will speak on the subject of the "Trade - Practice Conference." Discussion of the trade-practice movement will conclude the technical sessions.

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Industrial Coal Reserves Rise To 33 Days' Supply

Stocks of anthracite and bituminous coal in the hands of industrial consumers in the United States and Canada on Aug. 1 were 32,735,000 net tons, according to the monthly report of the National Association of Purchasing Agents. This figure is equivalent to 33 days' supply, based on the July consumption of 30,500,000 net tons. Stocks in industries were 1,000,000 tons smaller on Aug. 1 than on the same date in July, due to a decrease in the reserves held by industries other than byproduct coke, railroads, electric utilities, and steel mills.

Commercial stocks of bituminous coal, used largely for industrial purposes, amounted to 32,200,000 net tons on July 1, according to the quarterly survey of the U. S. Bureau of Mines. This is a decrease of 900,000 net tons from the total on hand at the beginning of the previous quarter and on July 1, 1929, and is the smallest tonnage held by consumers since the fall of 1922, when stocks had not yet recovered from the effects of the prolonged suspension in mining in that year.

The usual seasonal decline in the rate of coal consumption, which normally occurs in the second quarter following the close of the heating season, was accentuated this year by the general business depression. All major classes of consumers in all regions of the country consumed less coal than in the corresponding quarter last year. The average rate of home consumption in the second quarter of 1930 was 7,614,000 tons per week. Exports amounted to 322,000 tons, and total consumption plus exports was 7,936,000 net tons. In comparison with the same period in 1929, the rate of home consumption plus exports shows a decrease of 1,057,000 tons per week, or 11.8 per cent. In addition to the stocks in the hands of consumers, substantial reserves were held on the upper Lake docks. According to reports from the dock operators, there was a total of 7,883,032 tons of bituminous coal on hand at the head of the Lakes on July 1. A year ago, the total stocks at the Lake docks were 6,629,262 net tons. Retail dealers' stocks of bituminous and anthracite increased in the second quarter.

Permissible Plates Issued

Three approvals of permissible equipment were issued by the U. S. Bureau of Mines in July, as follows:

(1) Diamond Machine Co.; rock-dusting machine; 15-hp. motor, 230 volts, d.c.; Approval 195; July 24.

(2) Goodman Mfg. Co.; Type 636 AK-3 entry-loader; 35-hp. motor, 440 volts, a.c.; Approval 196A; July 26.

(3) Goodman Mfg. Co.; Types 12EL-3 and 12CL-3 shortwall mining machines; 50-hp. motor, 220-440 volts, a.c.; Approvals 197 and 197A; July 31.

Days' Supply of Bituminous Coal in Various U. S. Industries

Byproduct coke	28
Electric utilities	61
Railroads	19
Steel mills	40
Other industries	34
Average total bituminous stocks throughout the United States	28

Estimates of Output, Consumption and Stocks, in Net Tons

	United States Production	Industrial Consumption	On Hand in Industries
July, 1929	45,635,000	35,040,000	31,415,000
August	49,843,000	34,886,000	32,712,000
September	51,307,000	35,960,000	34,289,000
October	59,567,000	39,482,000	36,107,000
November	51,719,000	38,747,000	37,313,000
December	53,858,000	38,581,000	37,512,000
January, 1930	56,816,000	38,512,000	39,007,000
February	45,712,000	35,195,000	37,078,000
March	40,324,000	37,083,000	36,554,000
April	40,776,000	36,230,000	31,535,000
May	41,901,000	34,685,000	30,700,000
June	38,897,000	31,613,000	30,824,000
July	40,373,000	30,496,000	31,500,000
Aug. 1	....	....	32,735,000

Washington Letter

By I. D. Foos
Special Correspondent

THE desirability of setting up a trade-practice code for general application throughout the bituminous coal industry will be one of the main subjects of discussion at the thirteenth annual meeting of the National Coal Association, in Detroit, Mich., Oct. 15-17. The trade-practice code is not a novelty in the coal industry, but those now in effect have definite territorial limits. There are eleven such group codes, more or less similar in character, that are contributing materially to the elimination of abuses in the coal trade. The principal argument in favor of an industry-wide code is that as all codes must, of necessity, be more or less general in character, the industry as a whole should benefit by any stabilizing influence that such an instrument may exert.

Although the Federal Trade Commission's legalistic attitude has shaken the confidence of industry generally in the value of trade-practice conferences conducted under such official auspices, the codes retain in practice all the effectiveness that they ever had. A conference under the Commission's auspices never was a prerequisite to the formulation by any industry of a trade-practice code. There is nothing to prevent the coal industry from proceeding with the formulation of a code without calling in the Commission. In some quarters it is believed that this would be advisable under existing conditions.

Only two groups in the bituminous industry, the Utah producers and the Northwestern dock operators, have gone through the formality of a conference under the Commission's auspices. Other groups have sought, informally, the advice of the Commission's experts, but from then on they have been able to work out codes that conform, in general, to a set pattern, but recognize conditions peculiar to the coal industry. The code of the Colorado & New Mexico Coal Operators' Association is the most recent example of the application of this form of self-government in the coal industry. Other groups operating under trade-practice codes include: Northern Coal Producers' Association, Denver, Colo.; Williamson Coal Bureau, Williamson, W. Va.; Coal Trade Association of Indiana, Terre Haute, Ind.; Virginia Coal Bureau, Norton, Va.; Kanawha Coal Bureau, Charleston, W. Va.; Hazard Coal Bureau, Lexington, Ky.; Harlan Coal Bureau, Harlan, Ky.; Alabama Coal Exchange, Birmingham, Ala.; and the Southern Appalachian Coal Exchange, Knoxville, Tenn.

Although complete unanimity of opinion is lacking, the proposal for establishment of a "master code" in the bituminous industry commands substantial support. A trade-practice code does not offer a panacea for all of the ills of the coal or any other industry but something may be claimed for it if it helps to discourage the shipping of coal on consignment and secret rebating. Both of these evils are prevalent in other industries and trade-practice codes have been used to combat them with considerable effect.

Bureau of Mines Approves Explosives

One addition to the active list of permissible explosives was made by the U. S. Bureau of Mines in September. In addition, the basic data on "Genite C" was changed. Details for both explosives are given below.

Changes in the Active List of Permissible Explosives During September*

	Volume Poisonous Gases	Characteristic Ingredient	Weight of 1¼x8-In. Cartridge, Grams	Smallest Permissible Diameter, Inches	Unit Deflective Charge, Grams	Rate of Detonation in 1¼-In. Diameter Cartridge, Ft. per Sec.
Wesco Coal Powder No. 1[1]	A	1a	175	1¼	248	9,350
Genite C[2]	C	1a	104	1¼	226	8,500

* Class designations are fully explained in *Coal Age*, July, 1930, p. 426. [1] West Coast Powder Co. [2]General Explosives Corporation.

Obituary

Franklin P. McFarland, of McFarland & Rothert, died at Altoona, Pa., Aug. 4, after an illness of several months. Mr. McFarland, who was 61, became interested in coal and lumbering at Frugality, Pa., early in his life, and in 1913 went into business for himself as a coal operator and broker. In 1928, with Oliver Rothert, of Altoona, he formed the coal operating company which bears their names.

George L. Ramsden, 56, superintendent of the Sipsey mine of the DeBardeleben Coal Corporation, Sipsey, Ala., died in a hospital at Jasper, Ala., Aug. 16, from injuries received when he was thrown from a wrecked trip of cars on Aug. 14. Mr. Ramsden, until a few months ago superintendent of the Hull mine of the DeBardeleben company, had been connected with coal-mining operations in Alabama for 35 years.

W. L. Robinson, superintendent of fuel and locomotive performance for the Baltimore & Ohio R.R., with headquarters at Baltimore, Md., died suddenly at his home in Jessup, Md., Aug. 7, after a brief illness. Mr. Robinson, who was born at Danville, Va., Oct. 6, 1883, entered the service of the Baltimore & Ohio as a special apprentice at the Mount Clare shops, Baltimore, in 1904, and served in various positions until his appointment as fuel superintendent in 1921.

Thomas P. Morgan, 79, owner of the Shamrock and Imperial mines in northern Colorado, died Aug. 20, at his home in Erie, Colo. The Shamrock mine last year received the Joseph A. Holmes Safety Association award for an excellent accident record over a number of years.

J. William McMillan, 62, vice-president of the Cumberland Coal Co., Baltimore, Md., died suddenly at his home in that city on Aug. 16. Mr. McMillan, a native of Knoxville, Tenn., went with the Cumberland company in 1907. He was an authority on coal freight rates, having previously been associated with the Southern Railway Co., in Washington, D. C.

Personal Notes

Walter S. Kelley, Wheeling, W. Va., has retired as vice-president and general manager of the Rail & River Coal Co., after service dating from 1911.

Ira C. Cochran has resigned as commissioner and secretary of the American Wholesale Coal Association, Washington, D. C., to become assistant administrator of the Philadelphia (Pa.) Retail Conference, the retail dealer organization in that city. Mr. Cochran joined the wholesalers' association in 1921, and before that was connected with the Pennsylvania R.R. and Weston Dodson & Co., Inc.

J. D. Kirby has resigned as superintendent for the C. H. Mead Coal Co., Beckley, W. Va., to accept a position with the Koppers Coal Co. at the Ingram Branch mine, Oak Hill, W. Va. Mr. Kirby went with Mead in 1923.

R. G. Worthington, Denver, Colo., president of the National Fuel Co., has been appointed commissioner of the Colorado & New Mexico Coal Operators' Association, in charge of the enforcement machinery for the recently adopted code of fair-trade practices.

J. H. Edwards, Huntington, W. Va., associate editor of *Coal Age,* has been appointed a member of the committee on applications to mining work of the American Institute of Electrical Engineers for the year beginning Aug. 1.

Harry G. Williams, Scranton, Pa., assistant superintendent of the Olyphant division of the Hudson Coal Co., has resigned to accept a position as division superintendent for the West End Coal Co., with headquarters at Scranton.

Roy Ison, Jenkins, Ky., formerly district engineer for Mines Nos. 207-212 and 214 of the Consolidation Coal Co., has been promoted to superintendent of Mine No. 204, vice J. B. Moore, transferred to the Pennsylvania division of the company.

Utah Trade Practice Rules Revised by Commission

Certain of the trade-practice rules promulgated for the bituminous coal industry of Utah, issued shortly after a conference held in Salt Lake City, Utah, Dec. 3, 1929, have been revised by the Federal Trade Commission to include the following language from the statue: "with the intent and with the effect of injuring a competitor, and where the effect may be to substantially lessen competition or tend to create a monopoly or to unreasonably restrain trade."

The rules revised by the commission were Nos. 10, 11, 12, 13, and 14 of the Utah code. Rule No. 16 was modified. These rules deal with the payment of freight charges by the seller to induce the purchase of coal, when not extended to all person alike; giving of any form of adjustments or rebates for the purpose of altering retroactively the price quoted; postdating or predating invoices or contracts with the intention of discriminating in price between purchasers; furnishing trucks, furnishing or leasing scales, yards, yard facilities, or other equipment without adequate compensation, for according the equivalent of a discount on coal purchases, if not extended to all buyers without discrimination; granting of secret rebates or allowances with the intent of deceiving the public and the trade, and shipping coal on consignment.

Utah operators were given until Oct. 25 to submit any objections to the changes. If none is received by that time, the rules will be reissued with the changes ordered by the Commission. The Commission also has requested the Utah Coal Producers' Association to name a committee to co-operate in enforcing provisions of the code.

Fall of Rock Kills Eight

Eight men were killed, two were critically injured, and several others received minor injuries in a fall of rock on Aug. 9 in the Gilberton mine of the Philadelphia & Reading Coal & Iron Co., Gilberton, Pa. The dead and injured were part of a gang of 24 men engaged in repairing the Furnace slope, which in some places has a pitch of 60 deg. The workmen were engaged at a point about 900 ft. below the surface when a slab of rock broke the timbers at a point about 400 ft. above and slid down the slope, which pitches 40 deg. at that point, trapping them below it.

Coming Meetings

International First-Aid and Mine Rescue Contest, Sept. 16-18, at Jefferson County Armory, Louisville, Ky.

National Safety Council; annual Safety Congress, Sept. 29 to Oct. 4, inclusive, at Pittsburgh, Pa.

Kanawha Coal Operators' Association; annual meeting, Oct. 2 at Charleston, W. Va.

National Coal Association; annual meeting, Oct. 15-17, at Book-Cadillac Hotel, Detroit, Mich.

Illinois Mining Institute; annual meeting, Oct. 31 at Centralia, Ill.

Southern Appalachian Coal Operators' Association; annual meeting, Nov. 20, Knoxville, Tenn.

West Virginia Coal Mining Institute; annual meeting, Dec. 2 and 3 at Huntington, W. Va.

King Coal's Calendar for August

Aug. 1—Twelve miners are injured, two critically, in a powder blast in the Redbird mine of the Warner Collieries Co., Tiltonville, Ohio. The accident occurred while twenty men were in the shaft clearing up a fall of rock.

Aug. 4—Mass meeting is held at Nelsonville, Ohio, in a move to organize workers in the state of Ohio. Union officials were speakers and charged misrepresentation on the part of operators and treason in the ranks of the union as the cause of union disintegration.

Aug. 5 — William Green, president, American Federation of Labor, takes a hand in the union struggle in Illinois, when, in a letter to Victor A. Olander, secretary, Illinois Federation of Labor, Springfield, Ill., he requests that delegates of the insurgent faction of the United Mine Workers be denied seats at the state federation convention at Springfield, Sept. 15.

Aug. 6—Harry Fishwick, president, District 12, United Mine Workers, comprising the state of Illinois, and a leader in the revolt against the regular organization headed by John L. Lewis, announces that he will not be a candidate to succeed himself in the coming district election. He assigned as his reason a desire "to rest from the arduous tasks" he has performed.

Aug. 7—Representatives of the government and coal operators in British Columbia begin a conference at Victoria, B. C., to develop the coal trade in that province. The conference took steps toward the formulation of a plan to exclude fuel oil, which enters the province free, as well as a plan for the development of more efficient use of British Columbia coal.

Aug. 7—Tri-District convention of the United Mine Workers, meeting at Scranton, Pa., ratifies the new anthracite wage agreement by a vote of 737 to 127.

Aug. 8—Representatives of the United Mine Workers and of each individual hard-coal company formally affix their signatures to the new five-year wage contract for the anthracite region.

Aug. 9—Fall of rock in the Furnace Slope of the Gilberton colliery of the Philadelphia & Reading Coal & Iron Co., Gilberton, Pa., kills eight men and critically injures two others. The rest of a crew of 24 men escape without serious injury.

Aug. 11—An airplane, said to have been piloted by Paul Montgomery, Murphysboro, Ill., drops dynamite bombs on mines of the Ruckmann Coal Co., Meador, Young & Holt Coal Co., and the Diamond Coal Co., near the towns of Providence and Clay, Ky., in the strike section of Webster County. Property damage was small and no fatalities occurred.

Aug. 13—Explosion in the Coalmont Collieries mine of Coalmont Collieries, Ltd., Blakeburn, B. C., results in the death of 45 men. Rescue attempts were foiled by falls of rock and a mine fire.

Aug. 13—Insurgent faction of the United Mine Workers is virtually outlawed in Illinois for the time being when Circuit Judge J. C. Kern, Benton, Ill., grants miners representing local unions in Franklin County a temporary injunction restraining the insurgent organization or its officers from carrying on business in Illinois.

Aug. 14—Representatives of the Iowa Coal Institute and the Iowa Coal Operators' Association, at a meeting in Des Moines, Iowa, lay plans for a drive having as its objective the stimulation of the use of Iowa coal in Iowa, to the exclusion of out-of-state coal. The campaign will be carried on under the direction of the institute.

Aug. 15—Federation of Mine Owners in the Ruhr Basin, Germany, cancels the general wage schedule in force in coal mines as a forerunner to a wage reduction of 10 per cent. The move is deemed essential in the general price reduction of all manufactured goods sponsored by the government. Mine workers are expected to bitterly oppose the reduction.

Aug. 16—New low-temperature distillation plant of the Supercoke Corporation, for the production of "Prestcoke" briquets, dedicated in Chicago. Throughput of the plant is 600 tons per day, and it will treat Illinois, Indiana, and other Middle Western coals to make a smokeless fuel.

Aug. 16—Kentucky delegation, headed by W. O. Smith, county attorney of Muhlenburg County, asks Governor Flem D. Sampson for aid for miners and their families in western Kentucky who have been impoverished by labor troubles in the region.

Aug. 18—Noah H. Swayne, executive director of the Anthracite Institute, New York City, announces that an intensive and exhaustive study of anthracite will be made with the co-operation of Pennsylvania State College, Lehigh University, and Yale University, under the direction of Prof. Homer G. Turner, of Lehigh. It is expected that the program will uncover new uses for anthracite.

Aug. 20—Three coal-mining concerns in the Ruhr field of Germany petition the Ministry of Labor for permission to close one pit each on Sept. 1, because of the decline in business. Granting of the petitions would affect 1,500 miners.

Aug. 25—Six miners were killed and five others entombed in a cave-in in a coal mine at Wirek, Silesia, Germany, caused by earth tremors.

Aug. 26—A miners' "peace meeting" assembles at Belleville, Ill., in an effort to bring back harmony in the ranks of the Illinois union. Seventy-one delegates, including men identified with both the regular and insurgent factions, were present.

Aug. 27—Dynamiting is renewed in the Webster County (Ky.) strike section of Kentucky, with the setting off of several blasts at Providence, followed by the blasting of several poles of the Kentucky Utilities Co. power line.

Aug. 30—Five men were killed and nine were injured in an explosion in the Auchinrath colliery, Blantyre, Scotland.

First-Aid Meets Feature Month of August

Contest work as a means of demonstrating skill in first-aid reached its height in the month of August, when district and state meets were held in practically all of the coal-producing fields of the country. In starting off the month, a team representing the Carter mine of the Wheeling Steel Corporation, Wheeling, W. Va., scored 100 to win the Panhandle Safety Meet, held at Wheeling, Aug. 2. Second and third in the competition were the Wheeling Coal Co. team, Wheeling, W. Va., and the Windsor Power House Coal Co. team, Power, W. Va., respectively.

First honors in the Monongahela Valley Safety Meet, held at Riverside Park, Morgantown, W. Va., Aug. 2, under the auspices of the Monongahela Valley Coal Mining Institute, went to the Grant Town (W. Va.) team of the New England Fuel & Transportation Co. Second place was won by the Morgantown team of the Bethlehem Mines Corporation, and third place went to the Sands mine team of the Continental Coal Co., Rivesville, W. Va.

The Second Annual Sectional Safety Meet of the Kanawha District Coal Mining Institute, held at Montgomery, W. Va., Aug. 9, before a crowd of about 15,000 persons, was won by the Notamine (W. Va.) team of the Carbon Fuel Co. A team of the Wyatt Coal Co., Laing, W. Va., carried off second honors, while third place went to the Kingston (W. Va.) mine of the Kingston-Pocahontas Coal Co. In the colored division, first place was won by the Wyatt Coal Co. team. Second and third honors, respectively, were carried off by a Cannelton (W. Va.) team of the Cannelton Coal & Coke Co. and the Elkridge (W. Va.) team of the Black Betsy Consolidated Coal Co.

Twenty-four teams competed in the Third Annual First-Aid Contest of the State of Maryland, held at Frostburg, Md., Aug. 9. Mine No. 12 team of the Consolidation Coal Co., Frostburg, won first place with a score of 99.55 per cent. The Mount Savage (Md.) team of the Union Mining Co. took second place, and third honors were carried off by the Mine No. 1 team of the Consolidation company, Ocean, Md.

Fifty-two teams competed in the Second Annual First-Aid Contest, held at Harlan, Ky., Aug. 16. First prize was won by the Blue Diamond Coal Co. team, Bonnyman, Ky. Second and third places, respectively, went to the Verda (Ky.) team of the Harlan Wallins Coal Co. and the Lynch (Ky.) team of the U. S. Coal & Coke Co. Highest standing for combination first-aid and mine-rescue teams was won by the Comet (Ky.) team of the Harlan Wallins company.

Coming out in front of a field of 60 teams, the Jenkinjones (W. Va.) team of the Pocahontas Fuel Co. took first place in the Pocahontas District Safety Meet, held at Welch, W. Va., Aug. 16. The Twin Branch (W. Va.) team of the Fordson Coal Co. captured second place, while third went to the Superior (W. Va.) team of the Lake Superior Coal Co. In the colored division, the Berwind (W. Va.) team of the New River & Pocahontas Consolidated Coal Co. took first honors. Second and third places were captured by the Switchback (W. Va.) team of the Pocahontas Fuel Co. and the McComas (W. Va.) team of the American Coal Co. of Allegany County.

A Mine No. 86 team of the Consolidation Coal Co., Carolina, W. Va., captured first place in the Second Annual Safety Meet of the Central West Virginia Safety Association, held at Jackson's Mills, W. Va., Aug. 23. Second and third honors, respectively, were carried off by the Thomas (W. Va.) team of the Davis Coal & Coke Co. and a second team from the Carolina mine of the Consolidation Coal Co.

A hot contest for first place between three teams featured the annual Logan County Safety Meet, held at Logan, W. Va., Aug. 23. The Lundale (W. Va.) team of the Logan County Coal Corporation finally took first place, with a score of 800 plus. Second and third honors went to the Braeholm (W. Va.) team of the Amherst Coal Co. and the Rossmore (W. Va.) team of the West Virginia Coal & Coke Corporation, with scores of 800 and 800 minus, respectively.

Six thousand people attended the Twelfth Annual Virginia Safety Field Day ceremonies, held at Norton, Va., Aug. 23. First prize in the first-aid contest was won by the No. 1 team from the Derby (Va.) mine of the Stonega Coke & Coal Co. Second honors were captured by the Pardee (Va.) team of the Blackwood Coal & Coke Co., while third honors were carried off by the Clinchco (Va.) team of the Clinchfield Coal Corporation.

Forty-six teams were entered in the Pikeville First-Aid Contest, held Aug. 30, at Pikeville, Ky. First and second places, respectively, were won by Van Lear and Jenkins (Ky.) teams of the Consolidation Coal Co. Third honors were carried off by the Stone (Ky.) team of the Fordson Coal Co.

Sixteen teams competed in the Third Annual Mine Rescue and First-Aid Contest held at Renton, Wash., Aug. 30. In the mine rescue events, the Roslyn (Wash.) team of the Northwestern Improvement Co. took first place with a score of 99.2 per cent. Second in the competition was the Bellingham (Wash.) team of Bellingham Coal Mines, which scored 98.4. First place in the first-aid contest, as well as fourth place in the mine rescue events went to the Black Diamond (Wash.) team of the Pacific Coast Coal Co.

At the Fifth Annual Sectional Safety Meet, held at Madison, W. Va., Sept. 1, under the auspices of the Coal River Mining Institute, with 32 teams competing, two teams of the Nellis (W. Va.) mine of the American Rolling Mill Co. took first and second places. Third prize went to the Wharton (W. Va.) team of the Elkhorn Piney Coal Mining Co.

Jamison Buys Keystone Plants

The Jamison Coal & Coke Co., Greensburg, Pa., has purchased the mining properties of the Keystone Coal & Coke Co., of the same city, located at Crabtree, Luxor, Hannastown, Forbes Road, and Highland, Pa. Five mines, with a total daily capacity of about 7,600 tons, were bought, together with several thousand acres of coal land. The Keystone company retains its original properties, comprising five mines at Greensburg, Darragh, Hunkers, and New Alexandria, Pa.

Dominion Company Changes

Several changes in the executive staff of the Dominion Steel & Coal Corporation, Glace Bay, Nova Scotia, were made last month. H. J. Kelly, formerly general manager, became vice-president and a director of the company. Joseph A. Kilpatrick also was appointed to the board of directors. Arthur Irvine, who became general manager of coal sales in 1924, was made vice-president in charge of coal sales.

New Plant Construction

New contracts for topworks and construction under way or completed at various coal operations reported for the month of August are as follows:

C. C. B. Smokeless Coal Co., Helen, W. Va.; contract closed with the Kanawha Mfg. Co. for wood tipple equipped with primary and secondary shaking screens, four loading booms, mixing conveyor, refuse and bone conveyors, rescreen conveyor, and Menzies hydro-separator washing plant for cleaning egg, stove, and nut coals; capacity, 500 tons per hour.

Carnegie Steel Co., Clairton (Pa.) by-product coke works; contract closed with the Koppers-Rheolaveur Co. for the design and construction of a Rheolaveur plant for washing 3x0-in. coal to remove extraneous non-coking material and reduce sulphur. The capacity of the completed plant, which will cost $2,000,000, will be 12,000 tons of coal per day. Coal will be delivered to the plant in barges and stored in one of three 1,000-ton bins. From the bins, the various kinds of coal will be delivered to a mixing belt in any desired proportions and carried to the cleaning plant. Coal below ⅜ in. will be dried in Carpenter centrifugal dryers, and that above ⅜ in. will be dried on long dewatering shaking screens.

Killarney Smokeless Coal Co., Killarney, W. Va.; contract closed with the American Coal Cleaning Corporation for a pneumatic coal-cleaning plant consisting of a Type R separator to treat 40 tons of ⅜x0-in. coal per hour and a tube-type dust-collecting system.

Pittsburgh Terminal Coal Corporation, Pittsburgh, Pa.; construction started on a Chance sand flotation coal-washing plant to clean egg, nut and stoker coal; capacity, 480 tons per hour.

Reliance Coal Corporation, Reliance, Mo.; contract closed with the Pittsburg Boiler & Machine Co. for a wet cleaning plant using the Montgomery process; capacity, 200 tons per hour.

Southern Collieries Co., Williamsburg, Ky.; contract closed with the Morrow Mfg. Co. for a complete, four-track steel tipple, equipped with shaker screens, three loading booms, rescreen conveyor, refuse conveyor, and bin; capacity, 250 tons per hour.

United States Coal & Coke Co., Gary, W. Va.; contract closed with the American Coal Cleaning Corporation for complete coal-cleaning plant for installation at No. 8 mine, consisting of four Type R separators. Two of these will treat 150 tons per hour of 3x½-in. coal and the other two will treat 90 tons per hour of 1x½-in. coal. A tube-type dust-collecting system will be a part of the plant.

Coal-Mine Fatality Rate Higher in July, 1930, Than in June or Same Month Last Year

REPORTS received by the U. S. Bureau of Mines from state mine inspectors, covering accidents at coal mines during July, 1930, showed a higher death rate per million tons of coal produced than in June of the present year or in July of last year. The actual number of men killed was 143, which was 19 more than in the previous month and 12 less than in July a year ago. Coal production amounted to 40,373,000 tons, an increase of 1,476,000 tons as compared with June, 1930, and a decline of 5,795,000 tons as compared with July, 1929.

Bituminous coal mines had a higher death rate in July than in either the corresponding month last year or in June of the present year, the rate being 3.05 per million tons, as compared with 2.91 for last July and 2.91 for June, 1930. The number of men killed—106—was 8 more than in June but 14 less than in July of last year. July production of bituminous coal was 34,715,000 tons, 1,001,000 tons more than in the month before but 6,460,000 tons less than in July, 1929. Anthracite mines had a fatality rate of 6.54, as compared with 5.02 for June and 7.01 for last July. Deaths at this group of mines numbered 37, as compared with 26 in the previous month and 35 in July last year. The quantity of coal produced was 5,658,000 tons, 475,000 tons more than in June this year and 665,000 tons more than in July last year.

During the first 7 months of the present year, 1,132 lives were lost in accidents at coal mines. While this was 36 less than the number killed during the corresponding period last year, the death rate per million tons did not decline, being 3.71 this year as compared with 3.44 last year, owing to the fact that the output of coal fell off from 339,613,000 tons for the 7-months period a year ago to 304,799,000 tons for the same period of the present year. Expressed in percentages, the output of coal declined 10 per cent while the number of deaths declined only 3 per cent. The death rate for bituminous mines increased from 3.06 to 3.33, although the actual number of fatalities was reduced from 911 to 883, the increased death rate being due to the decline of output from 297,751,000 tons to 265,349,000 tons during the 7-months periods of 1929 and 1930, respectively. The fatality rate for anthracite mines likewise increased (from 6.14 last year to 6.31 this year) notwithstanding a decline in fatalities from 257 to 249, the production of coal having declined even more, proportionately, from 41,862,000 tons for the period January to July last year to 39,450,000 this year.

There have been no major disasters—that is, there have been no disasters in which 5 or more lives were lost—in either bituminous or anthracite mines since April, but 7 such disasters occurred from January to April and resulted in a loss of 88 lives. July a year ago was free from such disasters but 4 disasters during the previous months of last year caused the loss of 75 lives. Based exclusively on these major disasters the death rates per million tons of coal produced were 0.289 and 0.221, respectively, for the 7-month periods of 1929 and 1930.

Comparative fatality rates for 1930 and 1929 are as follows:

Cause	Year 1929	Jan.-July 1929	Jan.-July 1930
All causes	3.581	3.439	3.714
Falls of roof and coal	1.934	1.849	2.015
Haulage	.675	.674	.623
Gas or dust explosions:			
Local explosions	.082	.071	.141
Major explosions	.238	.203	.279
Explosives	.145	.144	.151
Electricity	.133	.124	.131
Miscellaneous	.374	.374	.374

Mastellar Insures Employees

Group life insurance has been acquired by the Mastellar Coal Co., Keyser, W. Va., for the protection of 105 employees of the company. The policy was issued by the Prudential Life Insurance Co. of America for a total of $65,500. The insurance is of the contributory type, with the employees sharing in the payment of premiums with the employing company. Under the arrangement, each worker receives protection in amounts ranging from $500 to $15,000, the amount varying according to the rank or position held.

Coal Mine Fatalities During July, 1930, by Causes and States

(Compiled by Bureau of Mines and published by *Coal Age*)

State	Underground												Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.)	Falls of face or pillar coal	Mine cars and locomotives	Explosions of gas or coal dust	Explosives	Suffocation from mine gases	Electricity	Animals	Mining Machines	Mine fires (burned, suffocated, etc.)	Other causes	Total	Falling down shafts or slopes	Objects falling down shafts or slopes	Cage, skip or bucket	Other causes	Total	Mine cars and mine locomotives	Electricity	Machinery	Boiler explosions or bursting steam pipes	Railway cars and locomotives	Other causes	Total	1930	1929
Alabama	2		2		1							5													5	6
Alaska																									0	0
Arkansas			1	1								2													2	0
Colorado																									0	3
Georgia and North Carolina																									0	0
Illinois	4		1									5													5	5
Indiana																									0	2
Iowa	1											1													1	0
Kansas																									0	1
Kentucky	5		1				1					7								2				2	9	16
Maryland																									0	0
Michigan	1											1													1	1
Missouri																									0	0
Montana																									0	0
New Mexico	1		1									2													2	0
North Dakota																									0	0
Ohio	1		2									3													3	6
Oklahoma				1								1													1	0
Pennsylvania (bituminous)	10	7	4		3		1		1			26											1	1	27	32
South Dakota																									0	0
Tennessee	1											1													1	4
Texas																									0	0
Utah					3							3													3	1
Virginia	1											1													1	2
Washington																									0	1
West Virginia	20	6	12		1		1		1			41							1				3	4	45	40
Wyoming																									0	0
Total (bituminous)	47	13	24	2	8		3		2			99							1	2			4	7	106	120
Pennsylvania (anthracite)	11	8	3	2	5						3	32						1	2	1			1	5	37	35
Total, July, 1930	58	21	27	4	13		3		2		3	131						1	3	3			5	12	143	
Total, July, 1929	71	18	30	2	7		8	1	2		3	142	4				4		2	1			6	9		155

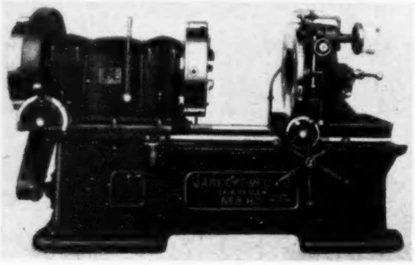
WHAT'S NEW

IN COAL-MINING EQUIPMENT

Heavy-Duty Threader Developed With Automatic Diehead

Faster threading is claimed for the new No. 8-HD threader manufactured by the Jarecki Mfg. Co., Erie, Pa. This machine, of the high-speed, heavy-duty type, has an average threading speed of over 29 ft. per minute, and cuts off 8-in. pipe at the rate of over 100 ft. per minute, the company says. Standard capacity of the diehead varies from 2½ to 8 in., with an extra capacity of 1½ to 2 in. if desired. Features of the new machine, as outlined by the company, are set forth as follows:

Exact duplication of threads, on every run, is assured by the automatic, self-opening diehead. A forged steel trigger, extending inside the diehead, automatically opens the dies when the correct length of thread had been cut. This trigger can be quickly set for any length



Jarecki Heavy-Duty Threader

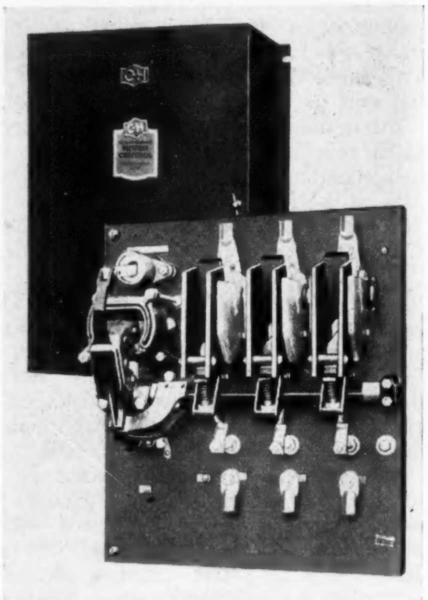
of thread desired, by means of a thread-length dial on the diehead, which is calibrated to ¼ in., as well as to the Briggs standard. The trigger recedes completely out of the way when the chasers are open, returning again to position when the chasers are closed. When desired, the chasers may be drawn back by hand.

Small chasers are held rigidly in large die holders, with a considerable saving of tool steel as compared to large dies. Chasers for the 8-in. machine are 2¼ in. wide, providing ample width for cutting an 8-in. standard thread. To speed up changing the chasers, they are clamped in three directions in large steel holders by one screw. The operative uses only a screw driver in taking out the screw, and can change a chaser in a few seconds. Chasers are set exactly to the size of pipe to be threaded by means of a hand-wheel placed on the diehead, which revolves the cam plate. The cam plate is marked for each pipe size in the machine's range. Chasers need not be changed for pipe of a different size, but only when the pitch of the thread is changed. Neither is it necessary to change dieheads, as the one takes care of all sizes of pipe for which the threader is designed.

A gear-driven, reversible pump supplies 16 qt. of clear oil to the diehead each minute. Streams of clean cutting oil bathe the cutting points of the chasers at all times. Timken roller bearings are used throughout to reduce friction and cut power cost. The operative can instantly select, from the six spindle speeds, the best speed for the size of pipe to be threaded. A handy speed-change disk is provided, on which each size is plainly marked. Quick changes in threading speed are made by a long lever within reach of the operative, and a multiple-disk clutch eliminates clash or jar. Overloads are guarded against by slippage in the clutch, protecting the gears, chasers, and pipe. The threader may be obtained in 4-, 6-, and 8-in. sizes.

Starting Equipment Offered

Three types of starting equipment for various kinds of service are now offered by Cutler-Hammer, Inc., Milwaukee, Wis. Among these are two magnetic contactors for heavy-duty, a.-c. service, rated at 300 and 600 amp., respectively. Features of the contactors, according to the company, make them applicable to all heavy-duty requirements. They are arranged, it is said, for either two- or three-wire control and have continuous-duty operating coils; highly efficient magnet structure; and exceptionally heavy, butt type, solid copper contacts. An air cushion absorbs the shock of the magnet on closing, reducing, it is claimed, the wear, and making the contactor operate more quietly. For general use, the 300-amp. equipment is mounted in a wall-type inclosure. The 600-amp. type is inclosed in a floor-type case.



Cutler-Hammer, 300-Amp., Heavy-Duty, A.-C. Contactor

The company offers a new three-position pilot switch for use with motor-driven pumps, compressors, and similar machines which are controlled by a pilot device and often, it is said, require some means of starting and stopping the motor manually. The operating lever of the switch can be placed in either the "automatic," "off," or "manual" position. On "automatic" the pilot device remains in the circuit, resulting in normal automatic operation. With the lever in the "off" position, the pilot circuit is opened and the motor cannot be started from any other control point. Turning the lever to the manual position closes the control direct, and the motor will run continuously regardless of any other control devices. The lever will remain in any one of the three positions.

For starting and stopping small d.-c.

Three-Position Pilot Switch

Starting Switch for Small Motors

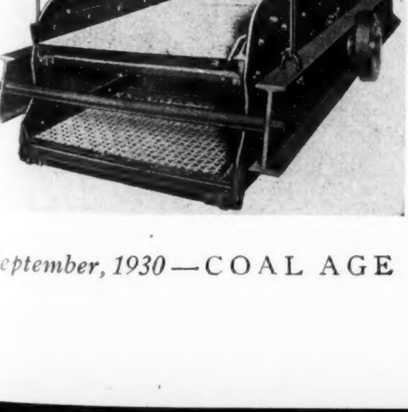
and polyphase a.-c. motors, the Cutler Hammer company has developed the 9103, two-pole, push-button-operated, starting switch with thermal overload relays. It may be used, the company says, with d.-c. motors up to $\frac{1}{2}$ hp. at 115 volts and $\frac{1}{4}$ hp. at 230 volts, or with single-, two-, or three-phase a.-c. motors up to 2 hp., 110 to 550 volts. Small size is emphasized by the manufacturer, who says that the switch can be mounted on the machine at the operative's finger tips.

Features pointed out by the company are: double-break, silver contacts, and quick-break contact mechanism assure long life and continuous current-carrying capacity; thermal overload relays allow the motor to be worked to the limit, yet will disconnect it as soon as an overload becomes dangerous; when the relays are tripped by an overload, simply pushing the "reset" button resets the relay and starts the motor; easy wiring is made possible by conduit knockout holes in the top and bottom of the switch inclosure.

Vibrating Screen for Coal Made in One Unit

J. S. Morrison Co., Inc., Pittsburgh, Pa., offers the "Summit" vibrating screen, for which the following features are claimed: sturdy construction, complete assembly on supporting members in the shop, shipment in such a way that the screen cannot be installed out of line or so that there will be side thrust in the bearings, and ability to stand up under continuous operation without

"Summit" Vibrating Screen



costly delays or repairs. This machine, which operates at high speed, is so designed, the maker states, that the shaft assembly will stay in line at all times, with a minimum of deflection and absence of side thrust in the bearings. Construction details, as outlined by the company, follow:

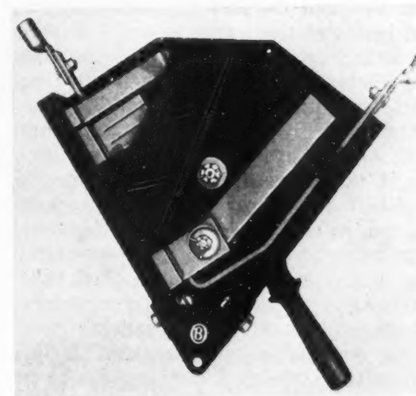
Oversize shafts are used, which run in SKF bearings, securely fitted into substantial housings. Outer bearing housings are flanged through the web of a 12-in. I-beam. The I-beams are tied together at the rear of the screen by two 3x3-in. angles braced with gusset plates at all four corners. Two eccentric bearings are used in each assembly, and are flanged into the side plates of the screen body close to the outside bearing, thus lessening the likelihood of deflection in the shaft. The eccentric bearings are kept in line by the use of flanges bolted to the inside of the side plates. Both flanges are connected by a pipe which slips over the shaft and acts as a dustproof cover. An Alemite system supplies grease to all four bearings independently. Bearings themselves are protected by brass and steel seals. Springs are mounted on the bottom flange of the I-beam, where they are out of sight but are easily accessible from the end of the beam. Machine bolts, fitted into reamed holes, are used throughout.

The equipment is so designed that material is fed to the top deck without unusual pound or wear on the cloth. Also, it is well spread out and subject to vibrating action before it reaches the cloth. Means are provided so that the material is deflected to the head of the second deck, thus increasing its effectiveness. The screen may be suspended on rods, installed on a frame support or hinged at one end and suspended at the other for easy change of angle. It can be driven by a belt or a motor mounted directly on the frame. Feed and discharge chutes and baffle plate, if desired, can be mounted directly on the screen frame.

Safety Switch Developed

A safety switch designed to eliminate the dangers of breaking heavy currents with the open-type switch has been developed by the Ohio Brass Co., Mansfield, Ohio, which says that the introduction of heavy mining machinery with correspondingly larger currents makes such equipment necessary. The switch is available in four sizes, with capacities of 200, 400, 600, and 1,500 amp. Safe breaking of the circuit is accomplished, it is pointed out, by means of a quick-make, quick-break feature combined with a magnetic blowout that extinguishes the arc.

Sectionalizing the mine may be readily accomplished by mounting a number of these safety switches along the ribs in the various feeder circuits, it is said. Full opening and full closing are always



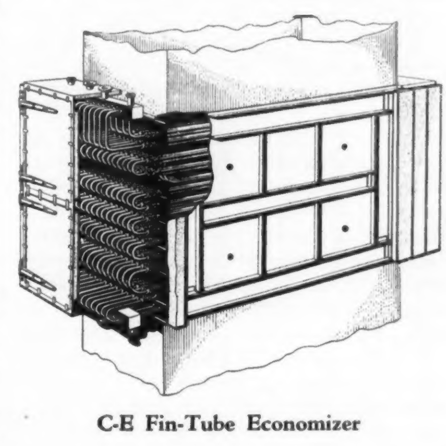
Ohio Brass Safety Switch

assured, it is declared, and repeated operation does not damage any part of the switch. A heavy rubber handle completely insulates the hand from any live parts.

Fin-Tube Type Economizer Has Extended Surface

The Combustion Engineering Corporation, New York City, has placed on the market the fin-tube type C-E economizer, which it declares can be installed in less than half the space required for a straight, plain-tube economizer of equivalent heating surface. Principal features outlined by the company are: external return bands, internal return bends, tube arrangement, and the use of finned tubes which provide additional heat-absorbing surface.

Heat-absorbing surfaces, the maker says, are constructed by connecting a U-bend to two straight tubes, thus



C-E Fin-Tube Economizer

forming a U-tube. The open ends of each U-tube are connected serially by return bends located outside the end-plates to the tubes directly above and below. Adjacent vertical tube sections are arranged so that the open ends of the U-tubes alternately enter one end and the other of the economizer casing. Water circulation is separated into two circuits, one running through the U-tubes connected by the return bends at one end of the economizer and the

other through U-tubes connected by return bends at the opposite end. Water flows through only one-half of the tube distance, as compared with the plain-tube, single-circuit type of economizer, a distinct advantage, according to the company. With extended surface in the form of fins, the tube length is still further reduced, resulting, it is claimed, in such a decrease in the frictional resistance that the water-pressure drop is about one-fifth of the plain-tube equipment. Both circuits are served by common inlet and outlet headers.

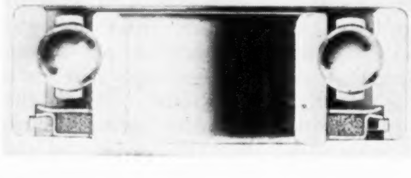
The compactness of the unit is derived, it is asserted, principally from the fin-tube design, which reduces the tube length per square foot of heating surface, and the return bend arrangement, which permits the tubes to be nested closely together, so that the space they occupy is less than one-half that required for the straight-tube economizer of equal heating surface. End plates are designed, the company says, to permit their quick cleaning and inspection.

Ball Bearing Has Felt Seal

SKF Industries, Inc., New York City, has developed a new felt-seal ball bearing, in which the felt seal is an integral part of the equipment, making it necessary for the purchaser to supply only the housing. Construction details, as given by the manufacturer, follow. Outer and inner races, as well as the balls are made of high-carbon, chrome-alloy steel, hardened throughout. Bore and outside diameter are ground to international standard dimensions and tolerances, the same as the corresponding standard, single-row bearings. The width of the new bearing, however, is slightly in excess of the standard dimensions to accommodate the felt seal, and the inner race projects a little beyond the face of the seal, in order that the bearing may be pulled off the shaft at any time without damaging the seal plates.

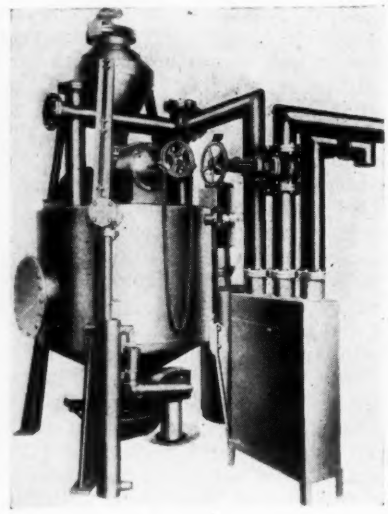
The seal consists of a dished inner steel plate, a removable felt, a dished steel end-plate, and a split steel ring fitted into the groove in the outer race to hold the assembly in place. It may easily be disassembled at any time and new felts applied. The bearing is available in sizes that are applicable to a wide range of small mechanical equipment, such as fractional horsepower motors, portable tools, and other small equipment.

Construction of the SKF Felt-Seal Ball Bearing



Large Capacity Claimed for Acetylene Generators

Oxweld Acetylene Co., New York City, has placed on the market two improved types of non-automatic, stationary, acetylene generators for supplying large volumes of acetylene. These generators are each made in two sizes, having 500 lb. and 1,000 lb. carbide capacity. They are



Oxweld, Type NA-3, Acetylene Generator

designed for large industrial plants where welding and cutting are used extensively and where oxygen and acetylene are piped to stations convenient to operators. The Oxweld Type NA-3 acetylene generator, is for plants using low-pressure welding and cutting apparatus and delivers to a storage holder which is weighted to supply acetylene to the shop piping system at a pressure of 20 in. of water.

In operation, the carbide is conveyed from the hopper to the generating chamber by a rotary feed screw driven by a slow speed reciprocating water motor. The screw, being cast nickel, is said to be very resistant to wear and will not cause sparks. From the generator the gas enters the wash box, where it passes through a water seal which acts as a scrubber. This device supplants the felt or hair filter usually employed. It has the advantage, according to the company, that it cannot clog and cause abnormal back pressure or insufficient delivery to the holder, thus insuring a constant generating pressure.

When residue is being drawn off from the generator the wash box acts as a vacuum release and permits a reverse flow of gas, which allows acetylene to return from the holder to the generating chamber to displace the drained water. When the generator is refilled with water, the gas passes from the generating chamber to the holder through this same wash box. The wash box is provided with an overflow which automatically limits the water level to give proper depth to the seal and to permit the functioning of the vacuum release during recharging.

A gas holder of suitable size may be located either inside or outside the generator house, as best meets the needs of the particular installation, the company says. On the holder is mounted an automatic water holder shut-off which stops the carbide feed mechanism. When the gas bell approaches its upper limit, this shut-off must be opened by the attendant before the generator will again produce acetylene. Except for this one automatic feature, all operations having to do with the starting and stopping of carbide feed must be performed by the generator attendant. For this reason, the generator is classed as non-automatic—that is, the carbide feed is not automatically governed by, or interlocked with, the immediate acetylene requirements.

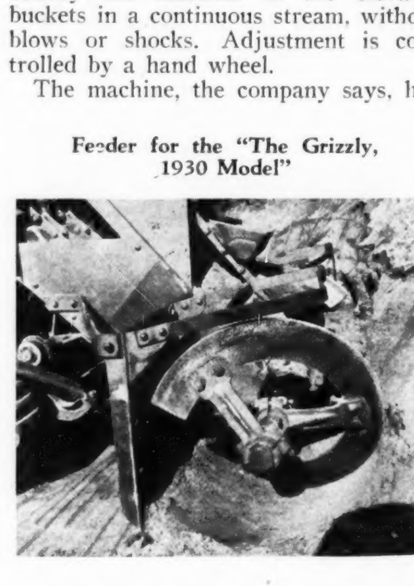
The Type NA-4 generator is similar to the Type NA-3, with the addition of an "Oxweld" automatic booster system to deliver acetylene to the shop piping system at pressures not to exceed the permissible limit of 15 lb. per square inch. The booster system consists of a booster pump; pressure regulating by-pass valve; pulsation tank; mercury seal; hydraulic back pressure valve; electric motor for driving the booster, and power transmission equipment. The booster unit may be had with a capacity suitable for the particular installation, the company says.

Crawler-Type Bucket Loader Is Self-Feeding

Link-Belt Co., Philadelphia, Pa., has developed what is termed a new, high-capacity, crawler bucket loader, known as the "The Grizzly, 1930 Model." Particular stress is laid on the construction of the self-feeder of the continuous, helical ribbon type, said to feed and clean-up uniformly. The action of its self-sharpening spiral and cutting edge serves, it is declared, to cut, dig and convey the material to the elevator buckets in a continuous stream, without blows or shocks. Adjustment is controlled by a hand wheel.

The machine, the company says, has

Feeder for the "The Grizzly, 1930 Model"

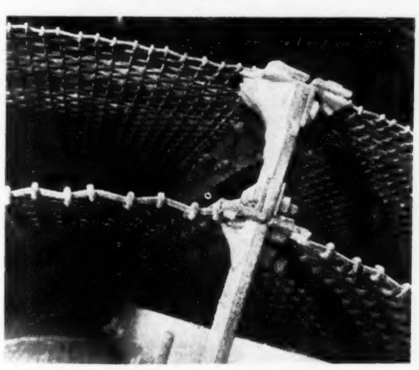


a rated capacity of $1\frac{3}{4}$ yd. per minute, handling mine-run coal and coke. It is powered by a 30-hp. Buda gasoline engine or a 20-hp. electric motor, either of which operates the entire machine. Crawler frames are one-piece steel castings, and the crawler is said to be wide enough and long enough to give ample stability.

Link-Belt Co., Indianapolis, Ind., has developed a new steel drive chain, designated the Link-Belt "Hyper" chain. It is made of alloy steel, heat-treated, and, it is said, uses a new type of pin and cotter. Pins, bushings, and holes in the side bars are accurately ground, it is asserted, and the cotters are so designed that they will not work loose when swelled into the holes provided in the pins for their reception. The Link-Belt Co. points out that the chain was developed to meet the need for a stronger and more durable type of chain for heavy positive power transmission. Ultimate strength, it is reported, is 75,000 lb. for the SS-40 chain and 150,000 lb. for the SS-124 chain. Tolerances are extremely fine, it is said, which insures press fits of the highest order, resulting in a durable chain.

Alloy-Steel Wire Offered For Screen Use

"Spring-Steel" woven-wire screens are now offered by the Ludlow-Saylor Wire Co., St. Louis, Mo. The company states that "Spring-Steel" is a hard,

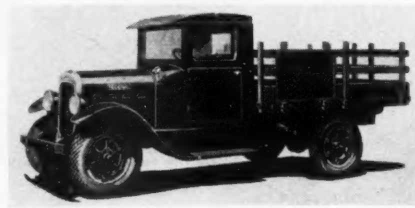


"Spring-Steel" in Use

resistant alloy for severe service on revolving screen jackets, vibrating screen sections, and shaking and gravity screening surfaces. Screens made of this material will last several times longer than those made of ordinary steel, the manufacturer asserts.

Motor Truck Has Capacity Of 1 to $1\frac{1}{2}$ Tons

The Federal Motor Truck Co., Detroit, Mich., has brought out the Model D truck for 1 to $1\frac{1}{2}$ ton transportation. The unit is powered with a 4-cylinder L-head engine developing $47\frac{1}{2}$ hp. at 2,500 r.p.m. It is equipped



Federal Model D Truck With Standard Cab and Stake Body

with a four-speed transmission. Speed, appearance, economy, and low cost are features claimed for the machine. With a single propeller shaft, the wheelbase is 131 in.; with two propeller shafts, the wheelbase is 151 in. The company says that the equipment may be obtained with a full line of standard bodies, or that special bodies may be built to order.

Fuse Wrench Announced

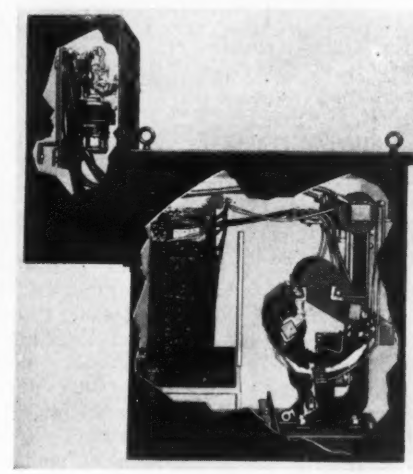
A new fuse wrench for tightening and loosening the caps of ferrule-type, renewable fuses has been developed by the Jefferson Electric Co., Chicago. The tool consists of a hardwood handle with a hole in each end, both of which contain a hardened strip for engaging the slot in the fuse cap or plug. To tighten or loosen the cap on a fuse, the company says, one end of the fuse is inserted into the wrench and the fuse is turned. The fuse is said to fit snugly into the hole and the strip is held squarely in the slot, making for greater leverage and a tighter cap connection or for ease in removing it. One end of the tool takes 250-volt, 1 to 30-amp. fuses and the other may be used with 250-volt, 35 to 50-amp., and 600-volt, 1 to 30-amp. types.

Full-Voltage Magnetic Starter Designed for 2,300 Volts

The Electric Controller & Mfg. Co., Cleveland, Ohio, now offers the Type ZHS, 2,300-volt, magnetic starter, which, complete with overload relays and a self-contained potential transformer (to secure 220 volts for the control circuit), is intended for across-the-line starting of squirrel-cage and synchronous motors. It also may be used, the company states, to control primary or slipring motors, and is built for reversing, non-reversing, and plugging applications. For use with synchronous motors, an automatic field-switching equipment may be added, the maker remarks.

In the design of the starter, bell-cranks, toggle mechanisms, or lever systems between the magnet armature and the movable contact arm were omitted. The magnet armature, carrying the moveable contact arm, is direct-acting and is supported by only one large bearing pin. Since the entire unit is totally immersed in oil, the maker asserts that all working parts are thoroughly lubricated and protected from dust and corrosion, insuring that the equipment will always be ready for operation, regardless of how long it may be out of service.

The contacts, the company says, open and close the circuit with a wiping and rolling action and are easily renewable. All the equipment is inclosed in heavy, welded steel tanks. This unit construction insures, it is claimed, a flameproof, corrosion-proof and dustproof installation that can be mounted anywhere with perfect safety. An expensive control room is not necessary, the company asserts, and the equipment may be mounted beside the motors it controls with a considerable saving in installa-



E. C. & M. 2,300-volt Magnetic Starter

tion costs. The starters are available in No. 2 and No. 3 sizes for 600-hp. and 1,200-hp. motors, respectively. Both may be controlled, the manufacturer points out, by master switches arranged to provide low-voltage release or low-voltage protection, or by pressure regulators, altitude regulators, or similar equipment.

Master Switch Regulates Control Circuits

A new master switch for regulating the control circuits of a magnetic contactor controller is being made by the Electric Controller & Mfg. Co., Cleveland, Ohio, for use where full-speed control from the master switch is desired. This switch, designated as the Type NT, is said to be almost frictionless in operation, due to the use of ball bearings, the short throw of the operating handle, absence of gears, the fact that the contact fingers always ride on an interrupted plane surface, and an accurately machine-notched track on which an improved roller-type centering device rides. The latter, it is claimed, allows the operator to feel distinctly the various speed points, the notch in the "off" position being more distinctly machined than the others.

Particular attention, the company points out, has been given to making

Electric Controller & Mfg. Co. Type NT Master Switch

the width as small as possible, so that the operator can easily reach all of a number of switches installed in a crane cage or pulpit. Other features noted are: straight-line lever operation, short throw of the switch handle, and adaptability to mounting in either upright or vertical position, thus permitting close grouping. Contact fingers are said to be easily removable. The switches are built to give a maximum of six points of speed control in each direction, with an overload reset at the "off" position. Master switches for four, five, or six points of control differ only in the location of the arm stops. These, the company holds, are easily changed to provide any one of these number of points desired, thereby reducing the spare part problem.

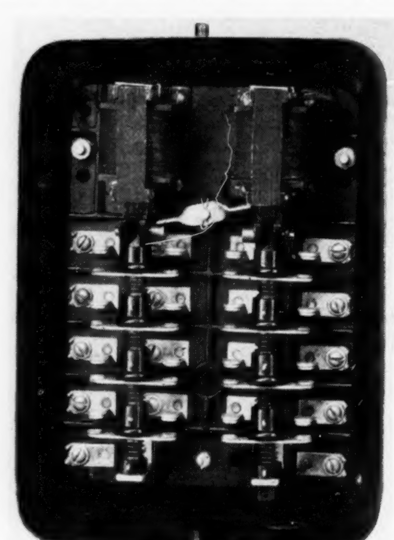
Control Reverses Small Motors

The General Electric Co., Schenectady, N. Y., has developed a convenient reversing equipment for small motors, designated as CR-7009-B-19. This switch, it is stated, is designed to handle squirrel-cage motors rated at 1½ hp. at 110 volts and 2 hp. at 220, 440, 550, and 600 volts, 25 to 60 cycles. It consists of two contactors mechanically interlocked, equipped with four sets of contacts and terminals. Three of the contact sets are for power circuits and the remaining one is for the holding circuit of the coil. Terminals are front-connected and marked to facilitate wiring. Equipment is placed on a compound base for mounting in an inclosing case, suitable, the company says, for wall mounting.

This company also has developed a quartz rod thermostat for controlling the temperature of soft-metal melting pots for melting lead, tin, babbitt, solder, and other metals. Temperature range of the equipment is 450-950 deg. F., and it will control temperatures to within 14 deg. of its setting, the company says. Contacts are designed to carry the current necessary to operate any standard automatic control panel, it is claimed.

The use of a copper-oxide rectifier in place of the field-flashing motor-generator set distinguishes a new design of automatic switching equipment for synchronous converters in mine service, the company says. Connected directly to the a.-c. power supply, the rectifier provides a definite source of power at correct polarity with which to flash the field, the company claims. The field flashing contactor and the main field contactors are still used.

Use of the rectifier, which is very small and designed for mounting on the back of the starting and running panel, eliminates some of the difficulties encountered with a motor-generator set, according to the maker. Two relays formerly used to check the polarity and voltage conditions and protect the relay against reverse current are now combined in one device, which also uses the rectifier in its circuit, the combination eliminating one relay and adding to the space available on the panel for other equipment. The d.-c. line contactor is provided with powerful opening springs and an auxiliary relay to shunt-out the resistor in the coil circuit during the closing period, insuring quick and positive action in both opening and closing.



Reversing Equipment for Small Motors

The equipment as a whole, the company asserts, provides protection against a.-c. and d.-c. overcurrent; a.-c. undervoltage and reverse phase; d.-c. reverse polarity; d.-c. reverse power; incomplete start; overheated bearings and windings; single-phase or unbalanced phase currents; overspeed; and wrong brush position.

A new line of electric brazing equipment also has been announced by the General Electric Co. Brazing with this equipment, it is explained, is caused by the heat generated by the flow of electricity through carbon blocks. As carbon offers a high resistance to the flow of electricity, the heat generated is said to be correspondingly high and but little pressure is needed to complete the joint.

The equipment, according to the company, consists of transformer, foot switch, and tongs for holding the carbon blocks and work. Sizes of the various parts depend upon the size of the work to be handled and the joints to be made. Parts to be brazed are either designed with flat surfaces or are flattened before brazing. After the work is clamped in the tongs, flux is added and the current turned on with the foot switch. When the flux melts, the brazing alloy is held against the hot metal until the alloy flows into the joint by capillary attraction. During the process of brazing, the hot alloy dissolves a thin film of the metal surfaces, thus forming, it is said, a new alloy rich in copper and with a higher melting point than the original alloy. Advantages claimed for the method over soldering are: less time; decreased cost, and joints with higher conductivity, mechanical strength and durability than those made with lead.

Color Used to Lengthen Motor Life

The Reliance Electric & Engineering Co., Cleveland, Ohio, now offers motor windings coated with a bright, orange-colored enamel. This step, the company says, enables maintenance men to detect trouble-making dirt at a glance, an impossibility with the old black finishing coat. Features of the enamel, as outlined by the Reliance company, are: it is an excellent insulation; it is entirely free of conductive solvents and consequently is a good dielectric either wet or dry; it is tough and adherent, and, last, it provides better than usual resistance to water, acid, and oil.

Belt Said to Be Static-Proof

A belt which the manufacturer declares eliminates all dangers resulting from the formation of static electricity in operation is offered by Chas. A. Schieren Co., New York City. In making the belt, a row of copper-wire stitching is put in along each edge. While the belt is in use, the stitching makes contact with the pulley face at all times. Static electricity is led off to the pulley and from it to the ground. Perfect protection may be had at all times as long as the pulley is grounded, the company says. Use of the "static-proof" belt, its maker states, eliminates the danger resulting from failure of the collectors used with ordinary belts, as well as the necessity for frequent application of certain types of belt dressing used for the same purpose. The "static-proof" belt is safe to use in the presence of inflammable fumes, gas or dust, according to the company.